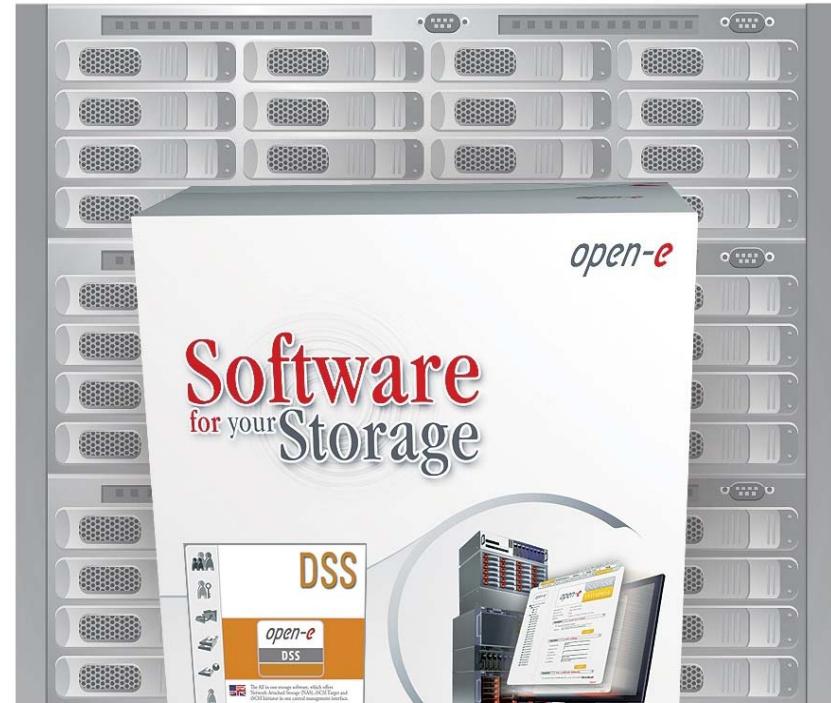


*Step-by-Step Guide to
Synchronous
Volume Replication
(Block Based)
with Failover over a LAN
Supported by Open-E® DSS™*



Synchronous Volume Replication with Failover over a LAN

	Replication Mode		Source/Destination			Data Transfer		Volume Type		
	Synchronous	Asynchronous	w/ System	LAN	WAN	File based	Block based	NAS	iSCSI	FC
									File-IO	
Synchronous Volume Replication with Failover over a LAN	✓			✓			✓		✓	

- **Open-E DSS Synchronous Volume Replication with Failover** is a fault tolerance process via iSCSI volume replication, that creates mirrored target data volumes.
 - Data is copied in real-time, and every change is immediately mirrored from the primary server to the secondary storage server.
 - In case of a failure, scheduled maintenance of the primary server, or loss of the primary data source, failover automatically switches operations to the secondary storage server, so processes can be continued as usual.

Synchronous Volume Replication with Failover over a LAN

VOLUME REPPLICATION WITH FAILOVER BETWEEN TWO SYSTEMS WITHIN ONE LAN

■ Recommended Resources

- Key Hardware (two systems)
 - ✓ x86 compatible
 - ✓ RAID Controller with **Battery Backup Unit**
 - ✓ HDD's
 - ✓ Network Interface Cards
 - ✓ Ping Node (ping node it is any permanently (24/7) available host in the network. In particular case the ping node function can be performed by the server storing the data on the iSCSI failover volume).
- Software
 - ✓ Open-E DSS, 2 units

■ Benefits

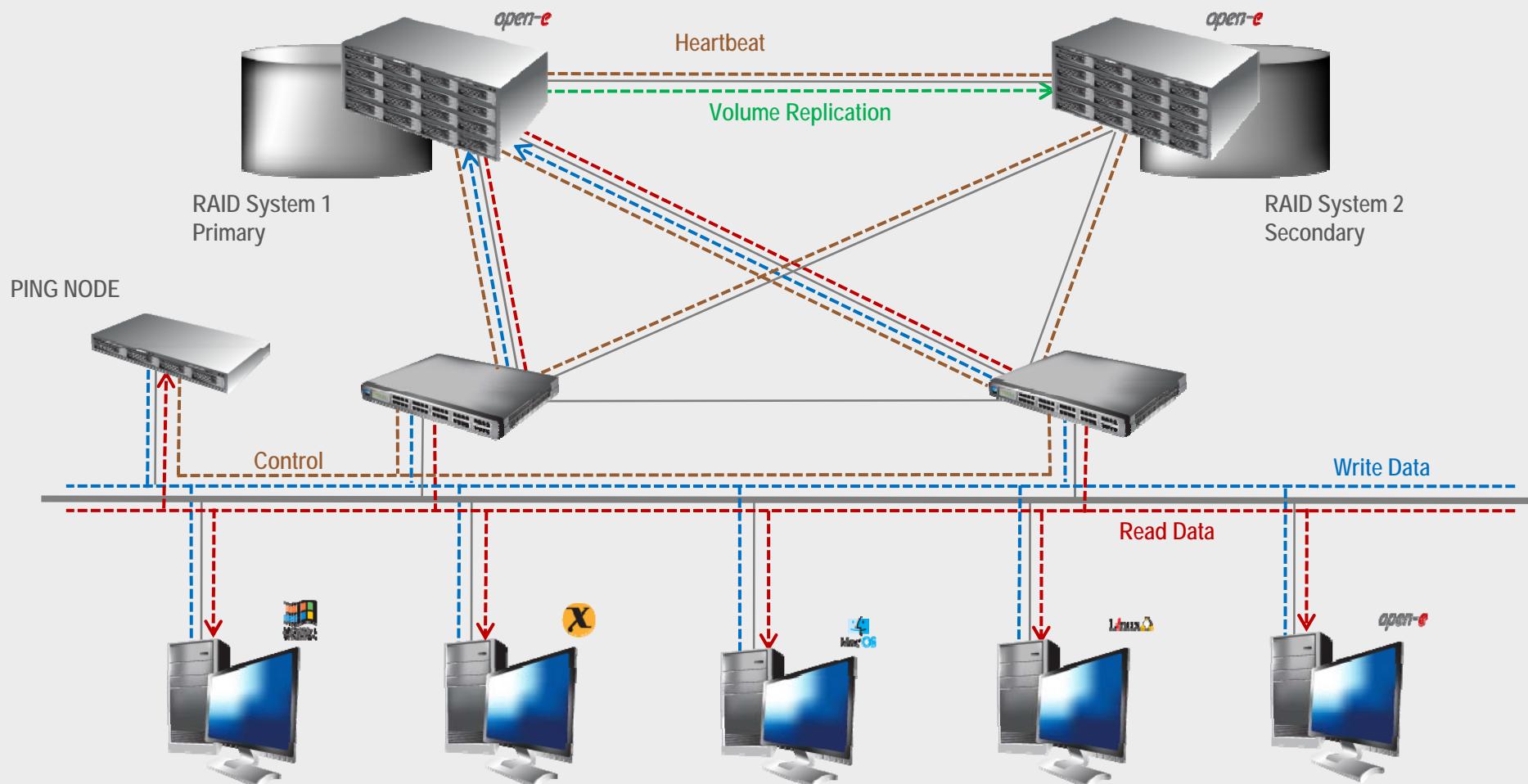
- Eliminate business disruption
- Data Redundancy over a LAN
- Switch Redundancy

■ Disadvantages

- High cost of solution
- Natural disasters (earthquake, fire, flood...) can destroy local systems

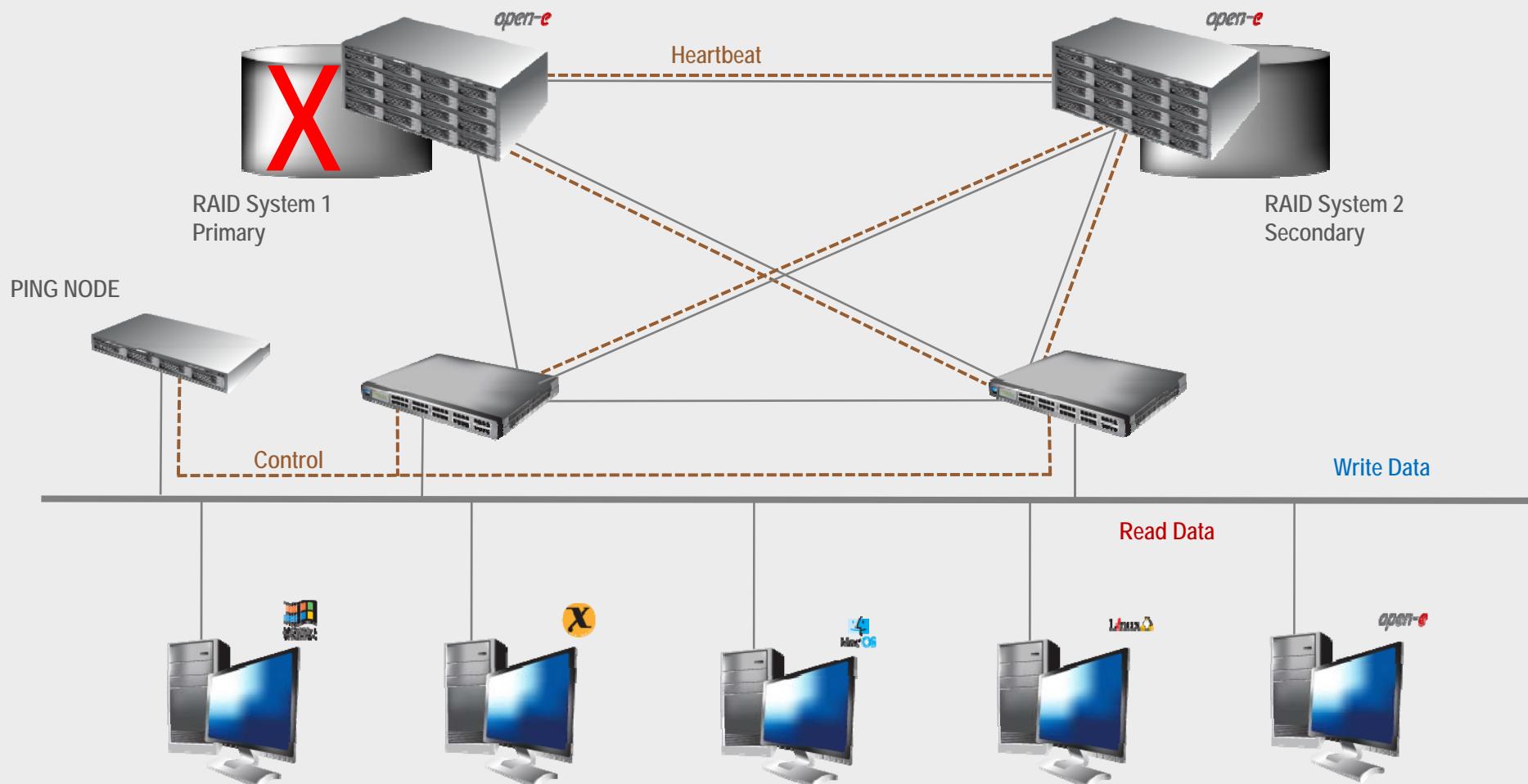
Synchronous Volume Replication with Failover over a LAN *open-e*

- Data is written and read to System 1 (primary)
- Data is continually replicated to System 2 (secondary)



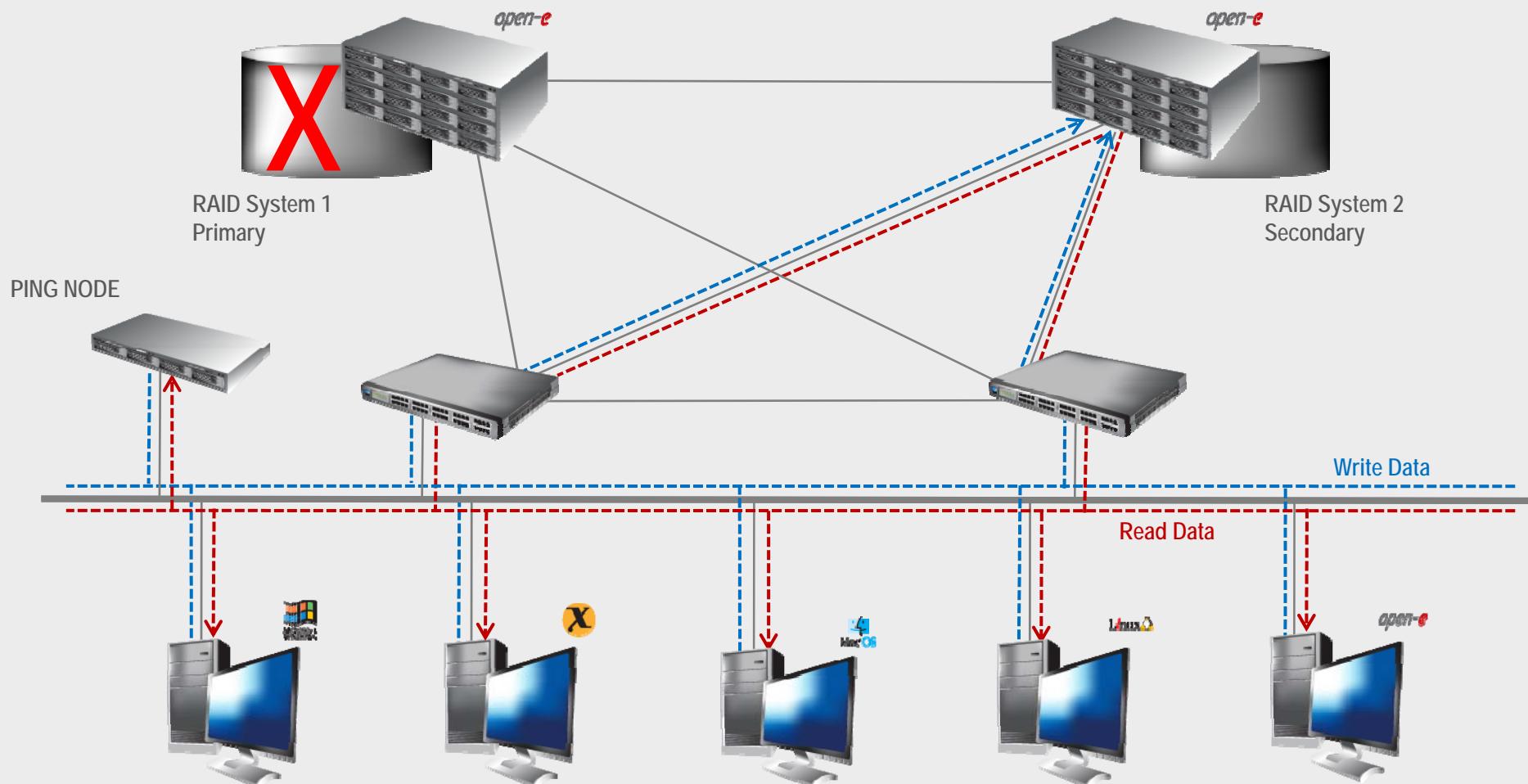
Synchronous Volume Replication with Failover over a LAN *open-e*

- In case of raid array or disk drive error on System 1(primary), the server will send an e-mail notification to the administrator
- iSCSI Auto Failover determines there is no connection between the servers
- After a few seconds Automatic Failover is executed and users are switched to System 2 (secondary)



Synchronous Volume Replication with Failover over a LAN *open-e*

- After switching, the replicated volume is available on System 2 (secondary)



Synchronous Volume Replication with Failover over a LAN *open-e*

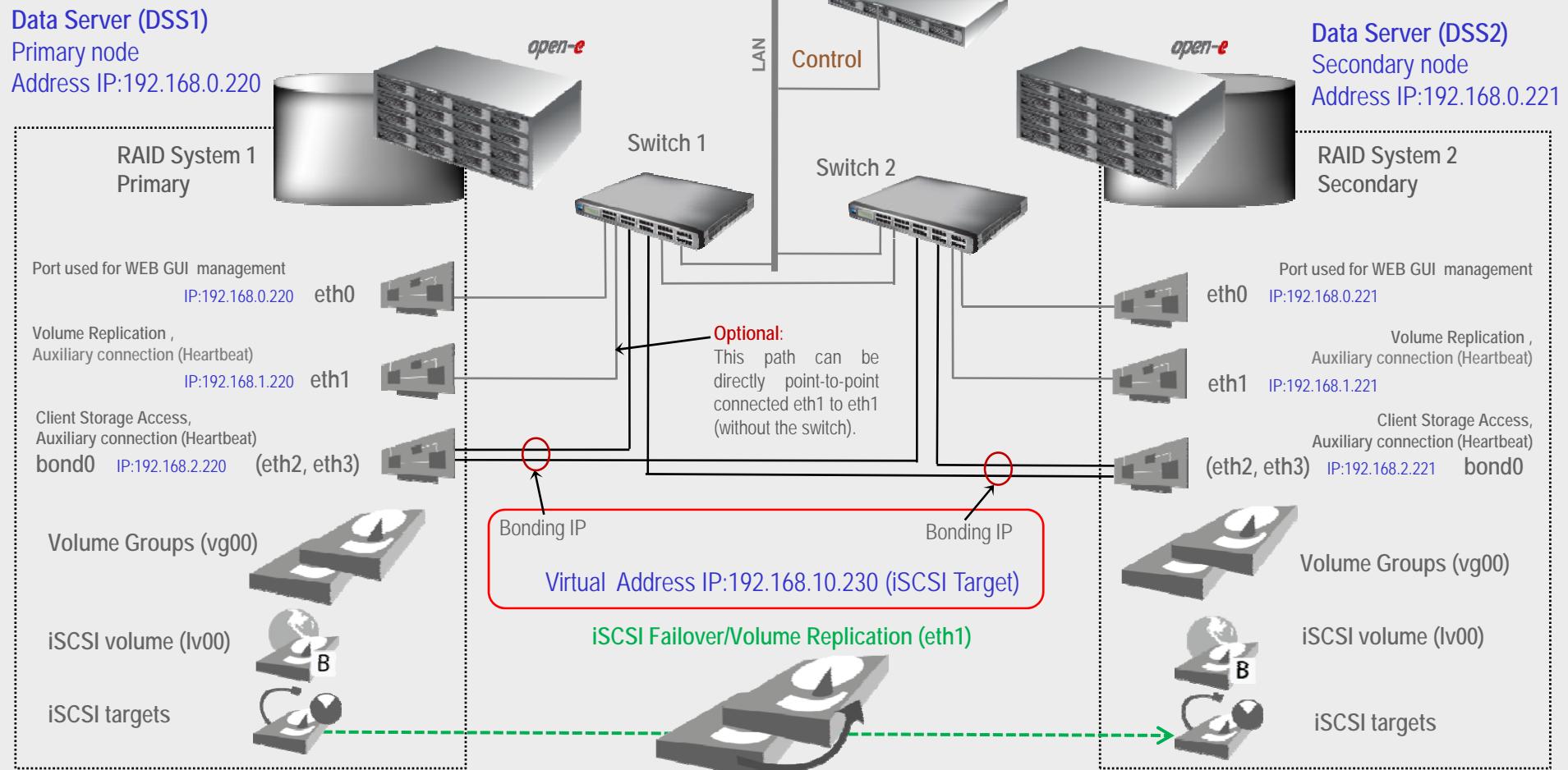
TO SET UP VOLUME REPLICATION WITH FAILOVER, PERFORM THE FOLLOWING STEPS:

1. Hardware configuration:
 - Settings server names, ethernet ports and bonding on secondary and primary node
2. Configure the Secondary node:
 - Create a Volume Group, iSCSI Volume
 - Configure Volume Replication mode (destination mode) – settings mirror IP address
3. Configure the Primary node
 - Create a Volume Group, iSCSI Volume
 - Configure Volume Replication mode (source mode) – settings mirror IP address, creating Volume Replication task and start replication task.
4. Create new target on Secondary node
5. Create new target on Primary node
6. Configure virtual IP and Auxiliary connection
7. Configure iSCSI Failover
8. Start Failover Service
9. Test Failover Function
10. Run Failback Function

Synchronous Volume Replication with Failover over a LAN *open-e*

Hardware Requirements:

To run the Volume Replication with Failover, two DSS systems are required. Both servers must be located and working in the Local Area Network. See below configurations for examples:



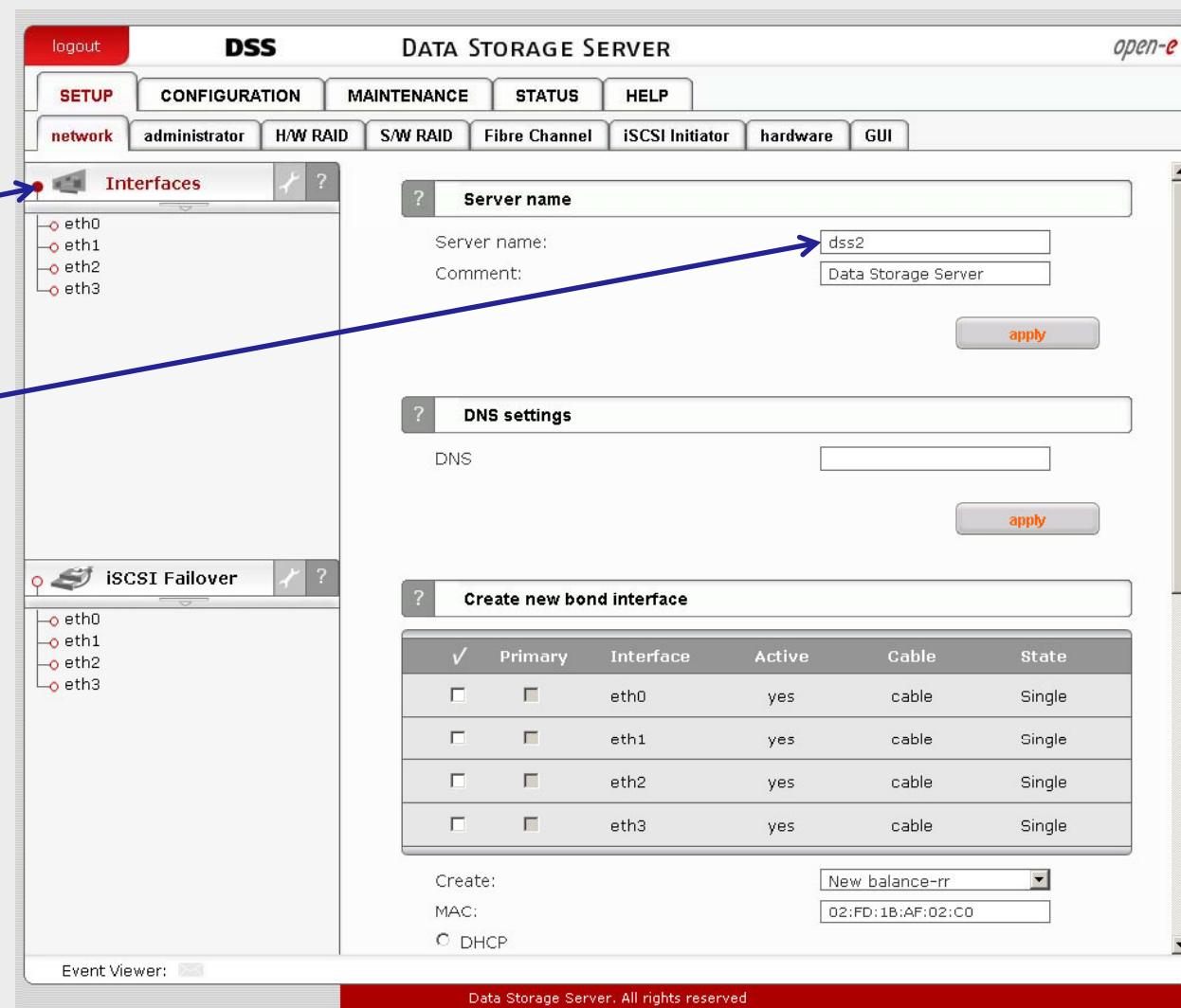
Synchronous Volume Replication with Failover over a LAN



Data Server (DSS2)
Secondary node
Address IP:192.168.0.221

1. Hardware Configuration

After logging on the DSS please go to „SETUP“ tab, „network“ and „Interfaces“. In „Server name“ function enter Server name, in this example „dss2“ and click **apply** button. (All connection will be restarted)



Server name: **dss2**

Comment: Data Storage Server

apply

DNS settings

apply

	Primary	Interface	Active	Cable	State
<input type="checkbox"/>	<input type="checkbox"/>	eth0	yes	cable	Single
<input type="checkbox"/>	<input type="checkbox"/>	eth1	yes	cable	Single
<input type="checkbox"/>	<input type="checkbox"/>	eth2	yes	cable	Single
<input type="checkbox"/>	<input type="checkbox"/>	eth3	yes	cable	Single

Create: New balance-rr

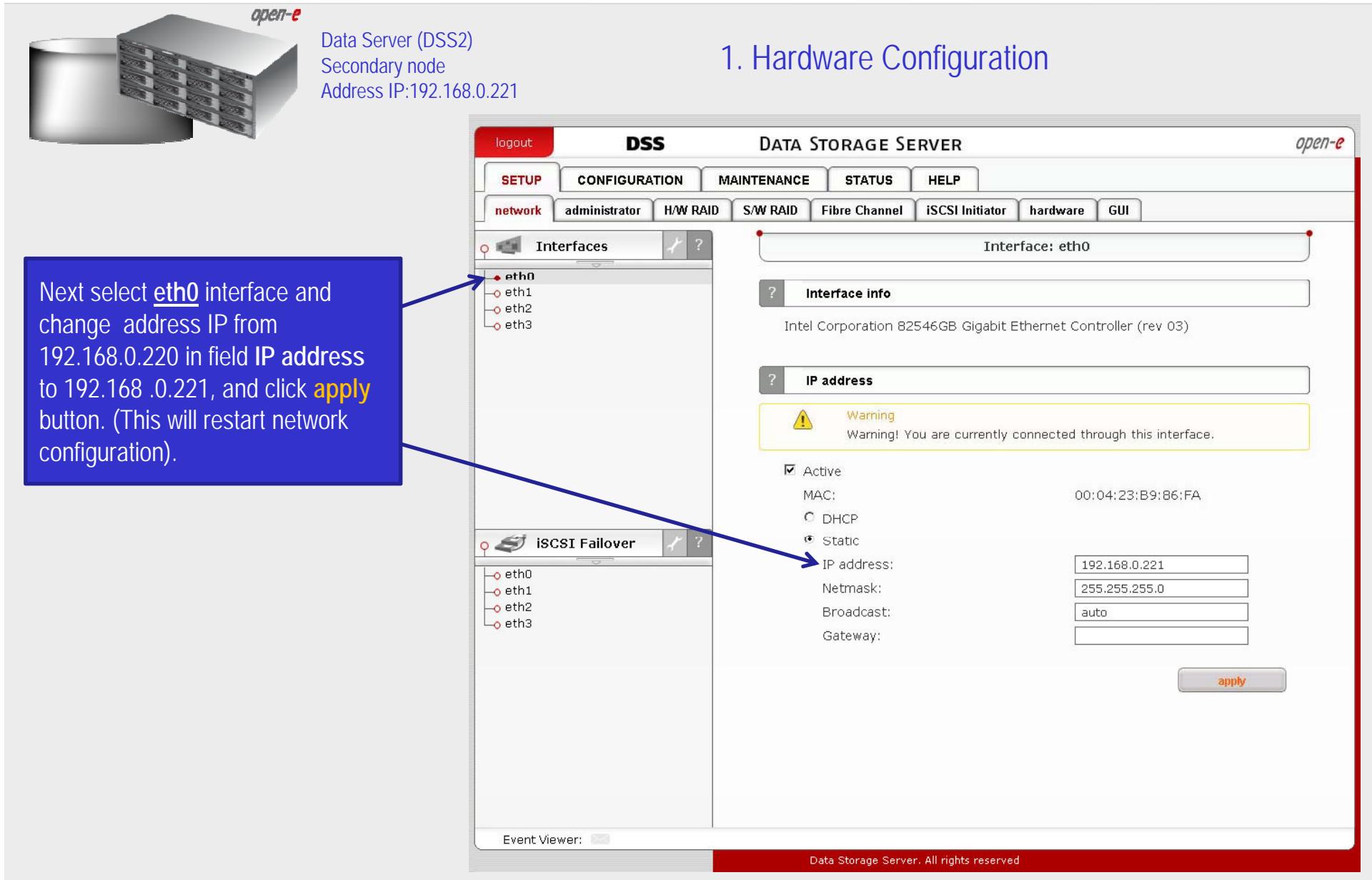
MAC: 02:FD:1B:AF:02:CO

Event Viewer: 

Data Storage Server. All rights reserved

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Synchronous Volume Replication with Failover over a LAN



1. Hardware Configuration

Next select **eth0** interface and change address IP from 192.168.0.220 in field **IP address** to 192.168.0.221, and click **apply** button. (This will restart network configuration).

Data Server (DSS2)
Secondary node
Address IP:192.168.0.221

open-e

DSS DATA STORAGE SERVER **open-e**

logout **SETUP** **CONFIGURATION** **MAINTENANCE** **STATUS** **HELP**

network administrator H/W RAID S/W RAID Fibre Channel iSCSI Initiator hardware GUI

Interfaces  

Interface: **eth0**

Interface info

Intel Corporation 82546GB Gigabit Ethernet Controller (rev 03)

IP address

Warning: Warning! You are currently connected through this interface.

Active

MAC: 00:04:23:B9:86:FA

DHCP

Static

IP address: 192.168.0.221

Netmask: 255.255.255.0

Broadcast: auto

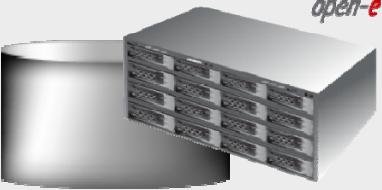
Gateway:

apply

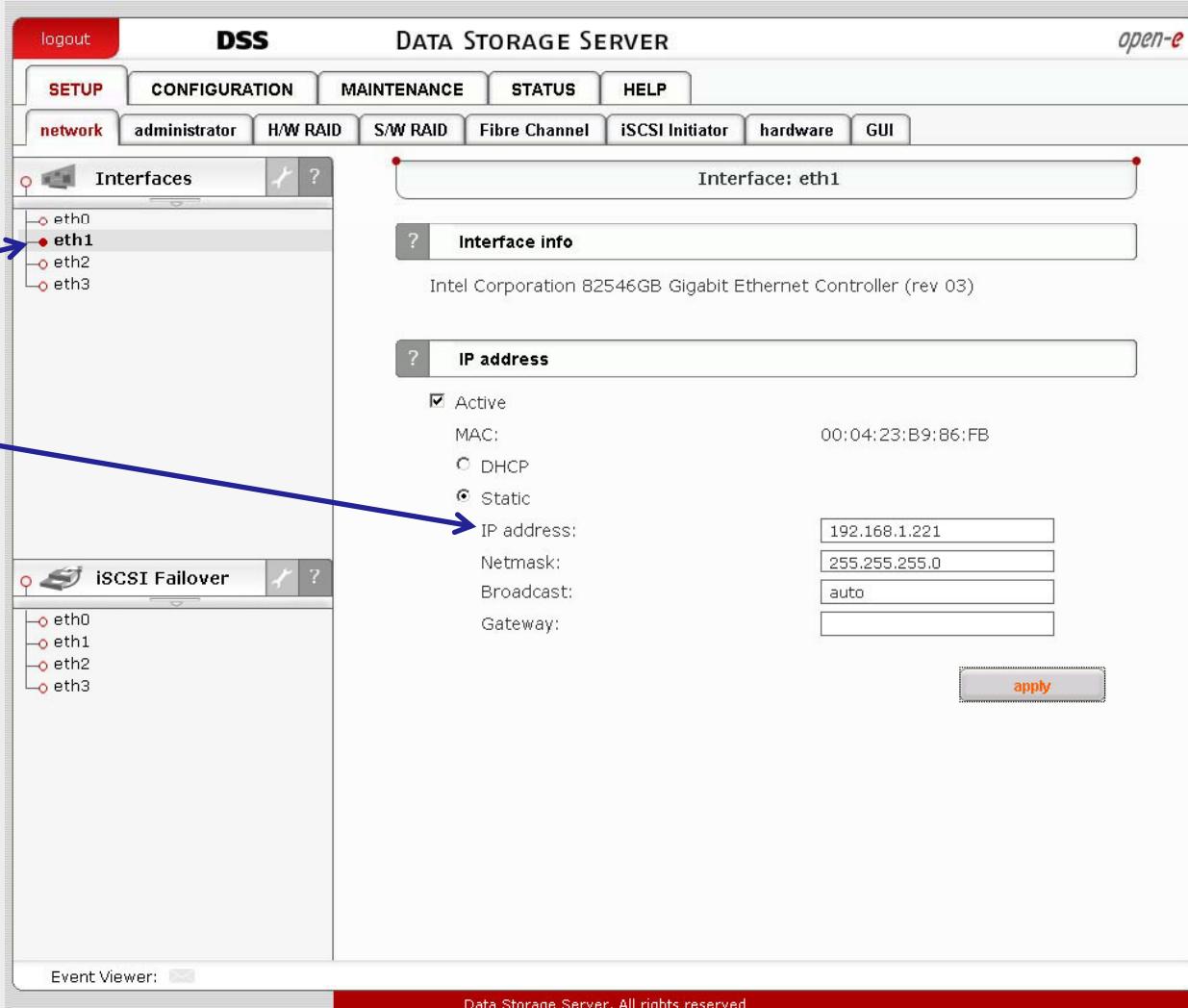
Event Viewer: 

Data Storage Server. All rights reserved

Synchronous Volume Replication with Failover over a LAN *open-e*

 Data Server (DSS2)
Secondary node
Address IP:192.168.0.221

1. Hardware Configuration



Next select **eth1** interface and change IP address from 192.168.1.220 in field **IP address** to 192.168.1.221 and click **apply** button.

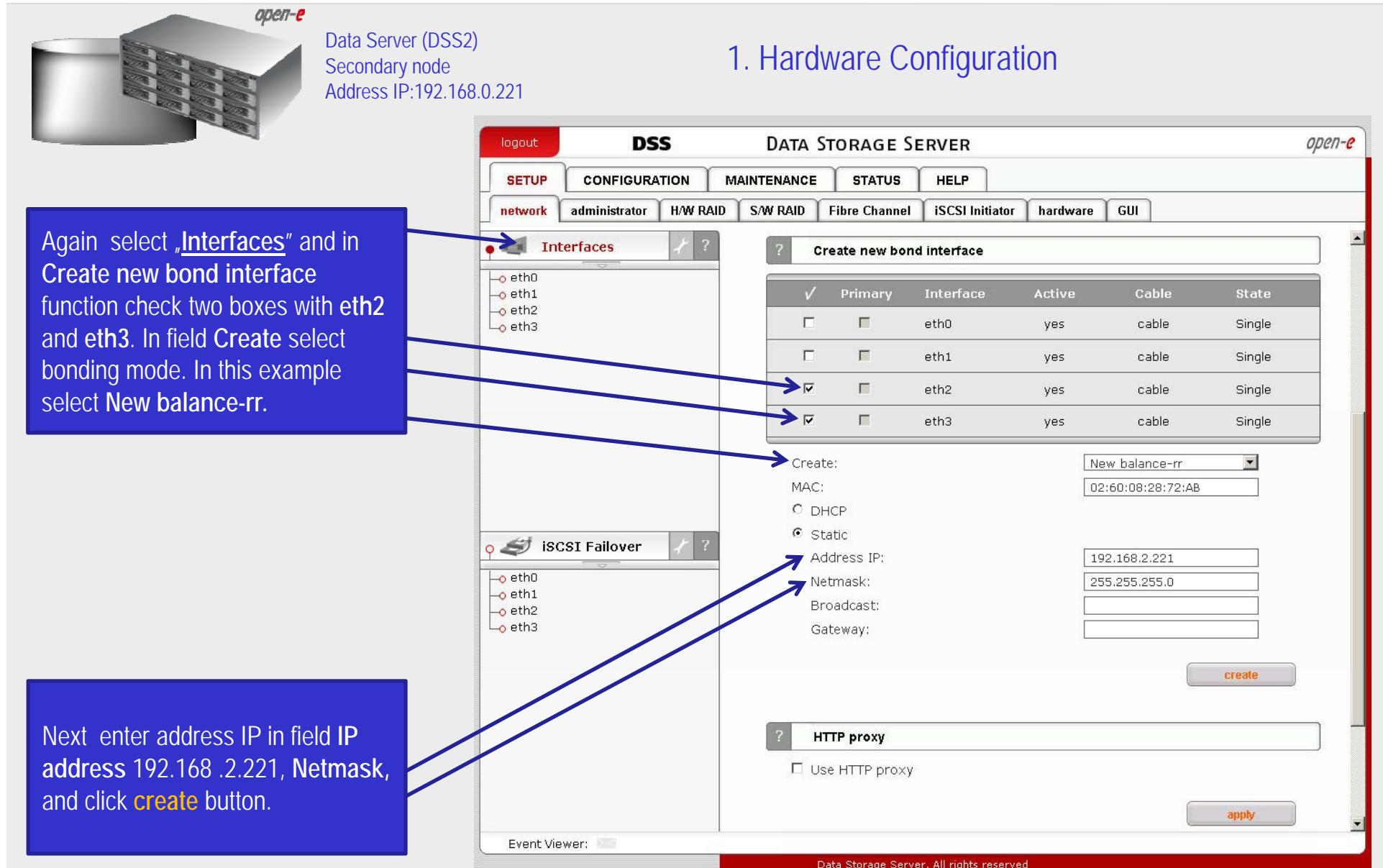
Interface: **eth1**

Interface info
Intel Corporation 82546GB Gigabit Ethernet Controller (rev 03)

IP address

Active
MAC: 00:04:23:B9:86:FB
 DHCP
 Static
IP address: 192.168.1.221
Netmask: 255.255.255.0
Broadcast: auto
Gateway:
apply

Synchronous Volume Replication with Failover over a LAN



open-e
Data Server (DSS2)
Secondary node
Address IP:192.168.0.221

1. Hardware Configuration

Again select „Interfaces“ and in Create new bond interface function check two boxes with **eth2** and **eth3**. In field Create select bonding mode. In this example select **New balance-rr**.

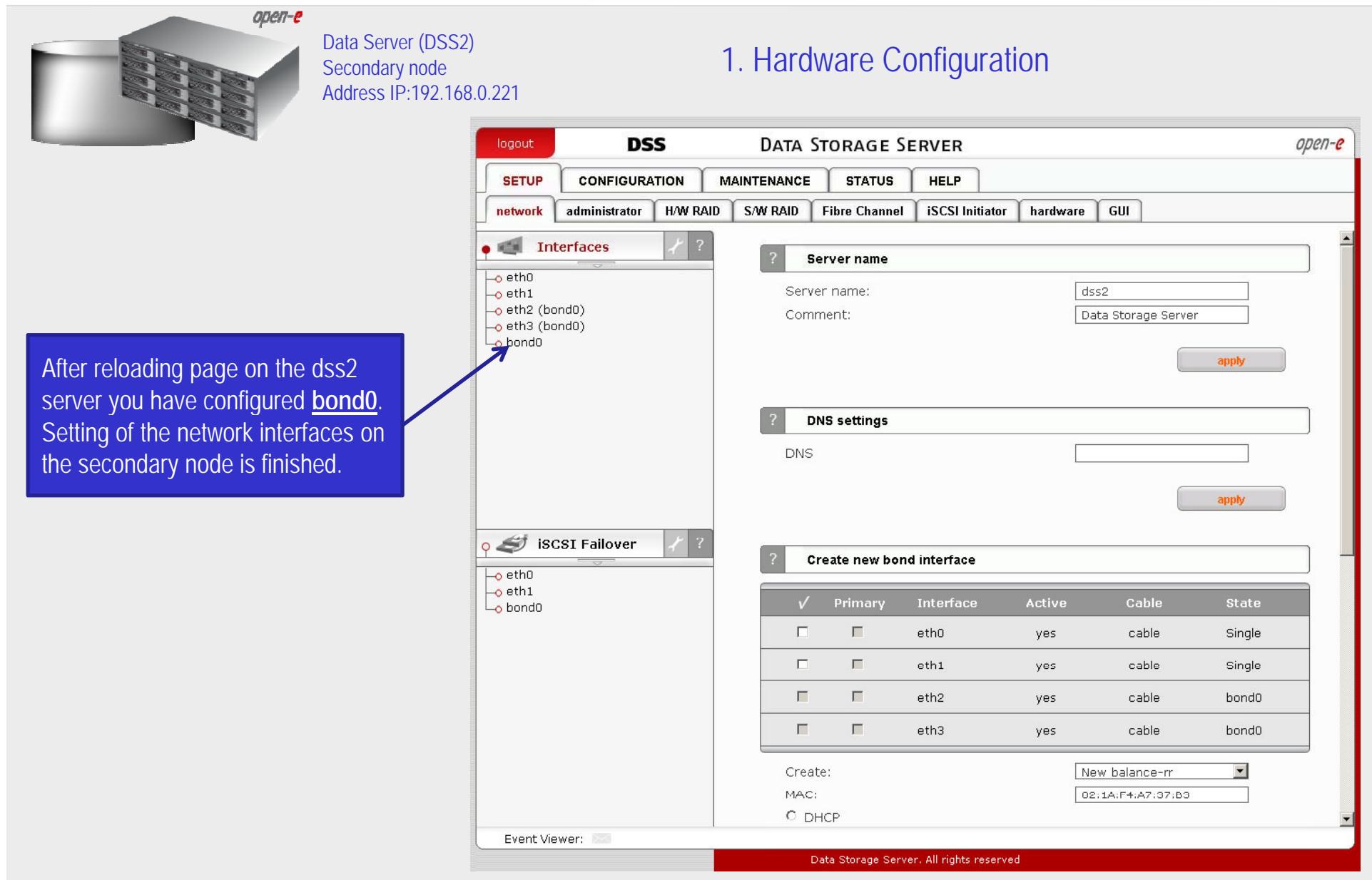
Next enter address IP in field **IP address** 192.168 .2.221, **Netmask**, and click **create** button.

Primary	Interface	Active	Cable	State
<input type="checkbox"/>	eth0	yes	cable	Single
<input type="checkbox"/>	eth1	yes	cable	Single
<input checked="" type="checkbox"/>	eth2	yes	cable	Single
<input checked="" type="checkbox"/>	eth3	yes	cable	Single

Create:
MAC:
Address IP:
Netmask:
Broadcast:
Gateway:
HTTP proxy:
Use HTTP proxy

create apply

Synchronous Volume Replication with Failover over a LAN



After reloading page on the dss2 server you have configured **bond0**. Setting of the network interfaces on the secondary node is finished.

1. Hardware Configuration

Data Server (DSS2)
Secondary node
Address IP:192.168.0.221

Interfaces

- eth0
- eth1
- eth2 (bond0)
- eth3 (bond0)
- bond0

iSCSI Failover

- eth0
- eth1
- bond0

Server name

Server name: dss2
Comment: Data Storage Server

DNS settings

DNS

Create new bond interface

✓ Primary	Interface	Active	Cable	State
<input type="checkbox"/>	eth0	yes	cable	Single
<input type="checkbox"/>	eth1	yes	cable	Single
<input type="checkbox"/>	eth2	yes	cable	bond0
<input type="checkbox"/>	eth3	yes	cable	bond0

Create: New balance-rr
MAC: 02:1A:F4:A7:37:D3
DHCP:

Event Viewer: 

Data Storage Server. All rights reserved

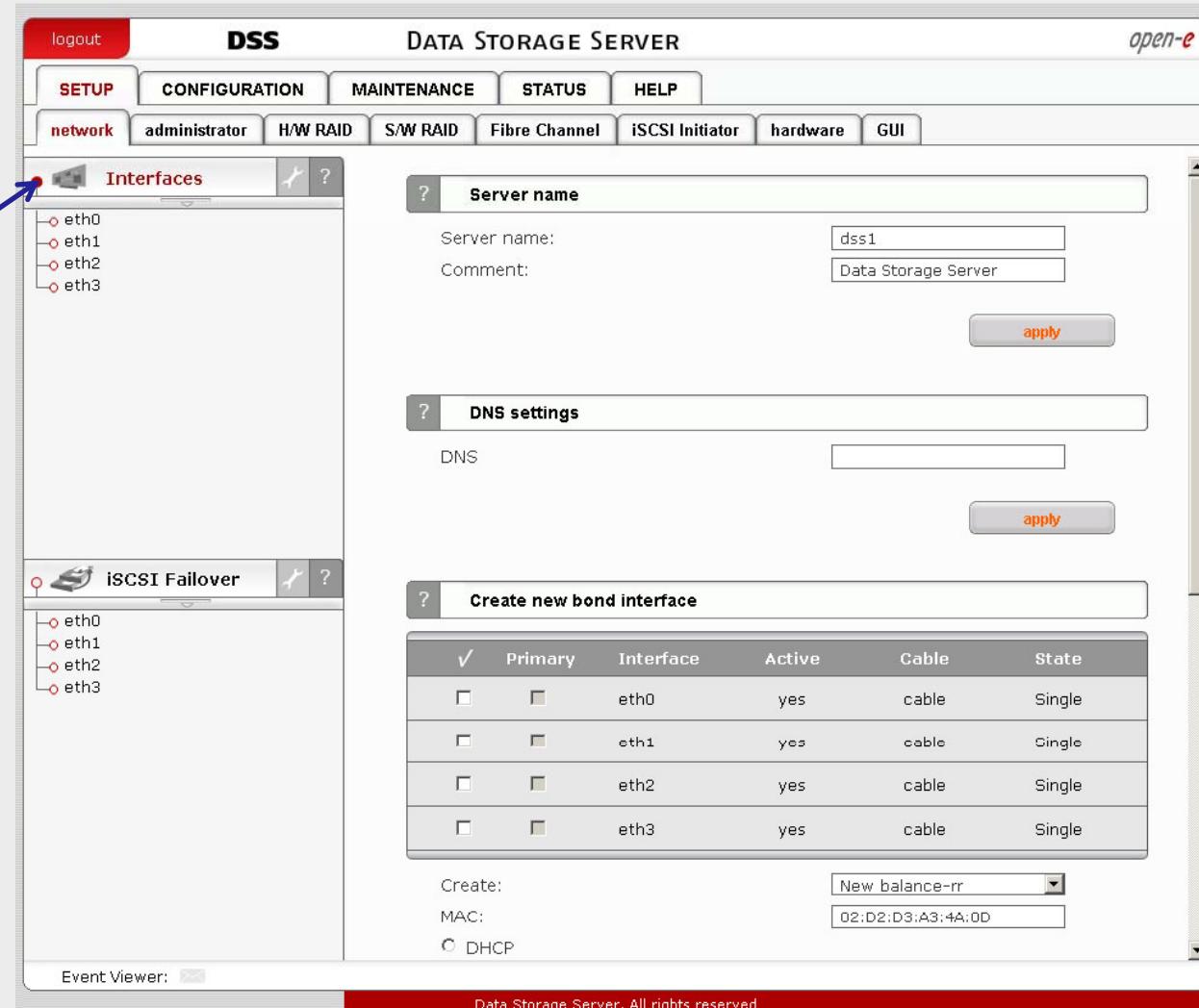
Synchronous Volume Replication with Failover over a LAN



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

1. Hardware Configuration

After logging on the primary node please go to „SETUP“ tab, „network“ and Interfaces. In „Server name“ function enter Server name. In this example enter **dss1** and click **apply** button. (All connection will be restarted).



Server name: **dss1**

Comment: **Data Storage Server**

apply

DNS

apply

✓	Primary	Interface	Active	Cable	State
<input type="checkbox"/>	<input type="checkbox"/>	eth0	yes	cable	Single
<input type="checkbox"/>	<input type="checkbox"/>	eth1	yes	cable	Single
<input type="checkbox"/>	<input type="checkbox"/>	eth2	yes	cable	Single
<input type="checkbox"/>	<input type="checkbox"/>	eth3	yes	cable	Single

Create: **New balance-rr**

MAC: **02:D2:D3:A3:4A:0D**

Event Viewer: 

Data Storage Server. All rights reserved

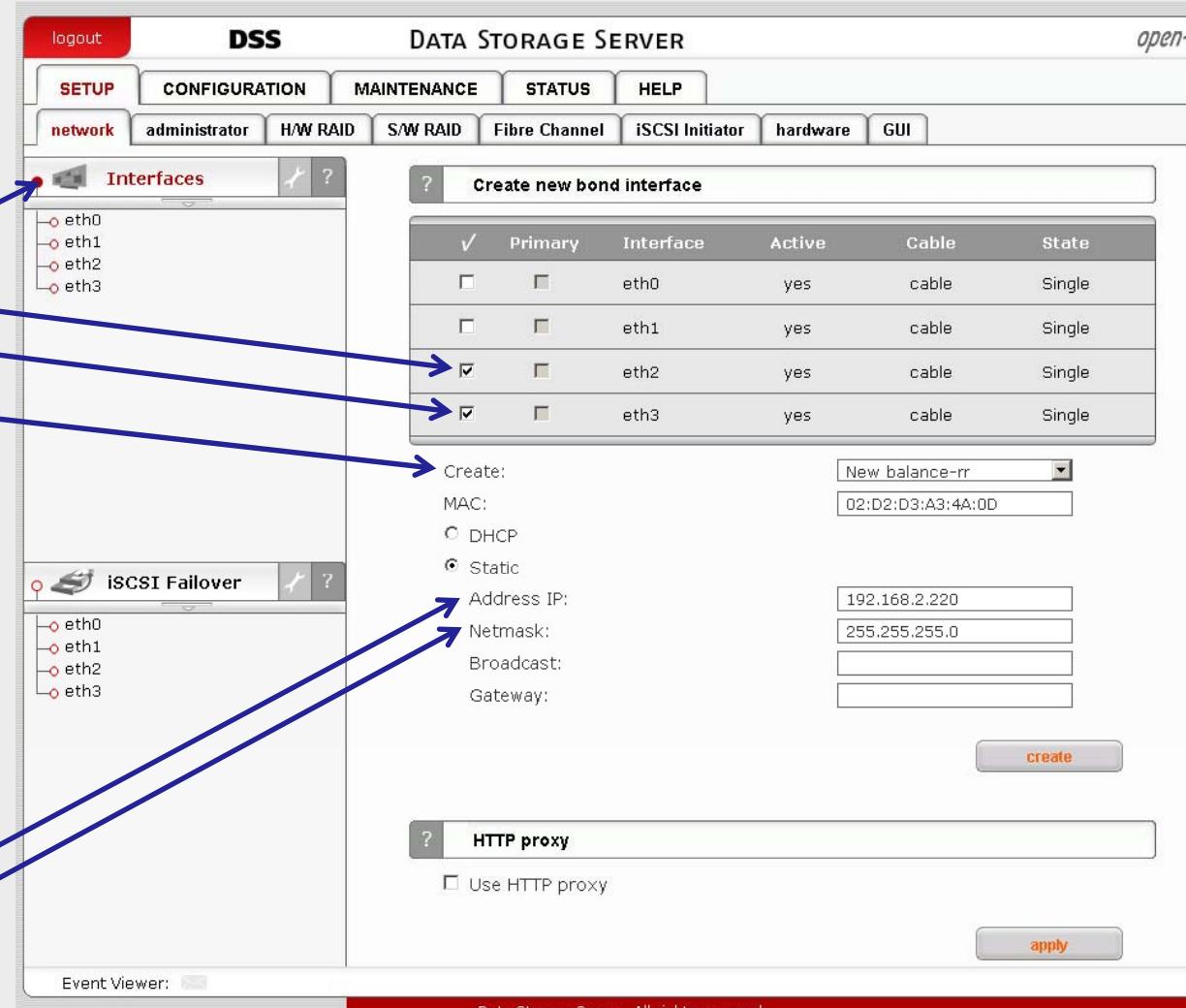
Synchronous Volume Replication with Failover over a LAN

 Data Server (DSS1)
Primary node
Address IP:192.168.0.220

1. Hardware Configuration

Again select Interfaces and in Create new bond interface function check two boxes with eth2 and eth3. In field Create select mode for bonding. In this example selected New balance-rr..

Next enter address IP in field IP address 192.168.2.220, Netmask, and click **create** button.



Event Viewer:

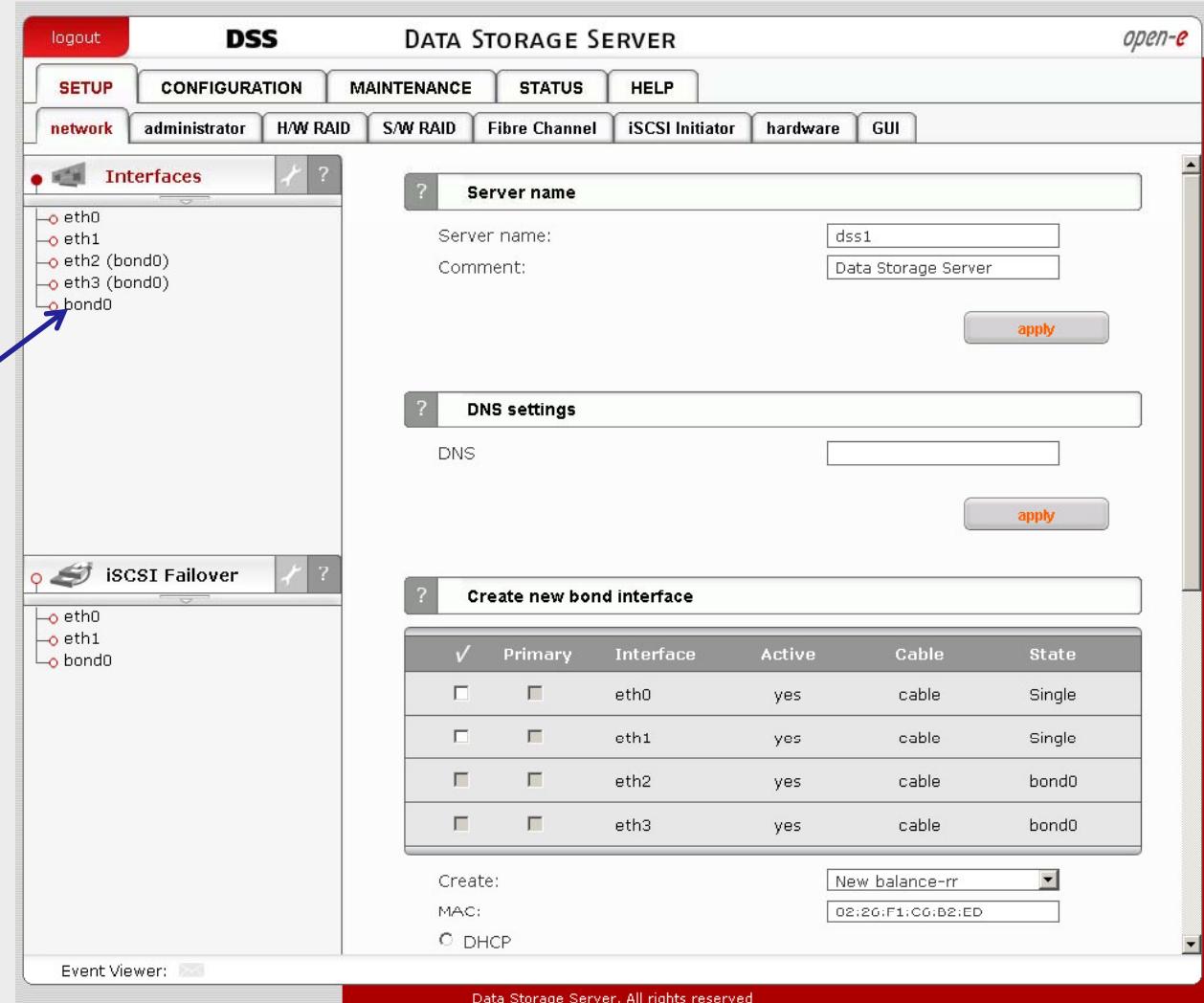
Data Storage Server. All rights reserved

Synchronous Volume Replication with Failover over a LAN



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

1. Hardware Configuration



After reloading page on the **dss1** server you have configured **bond0**. Setting of the network interfaces on the secondary node is finished.

	Primary	Interface	Active	Cable	State
<input type="checkbox"/>	<input checked="" type="checkbox"/>	eth0	yes	cable	Single
<input type="checkbox"/>	<input checked="" type="checkbox"/>	eth1	yes	cable	Single
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	eth2	yes	cable	bond0
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	eth3	yes	cable	bond0

Create: New balance-rr
MAC: 02:20:F1:CG:B2:ED
 DHCP

Event Viewer: 

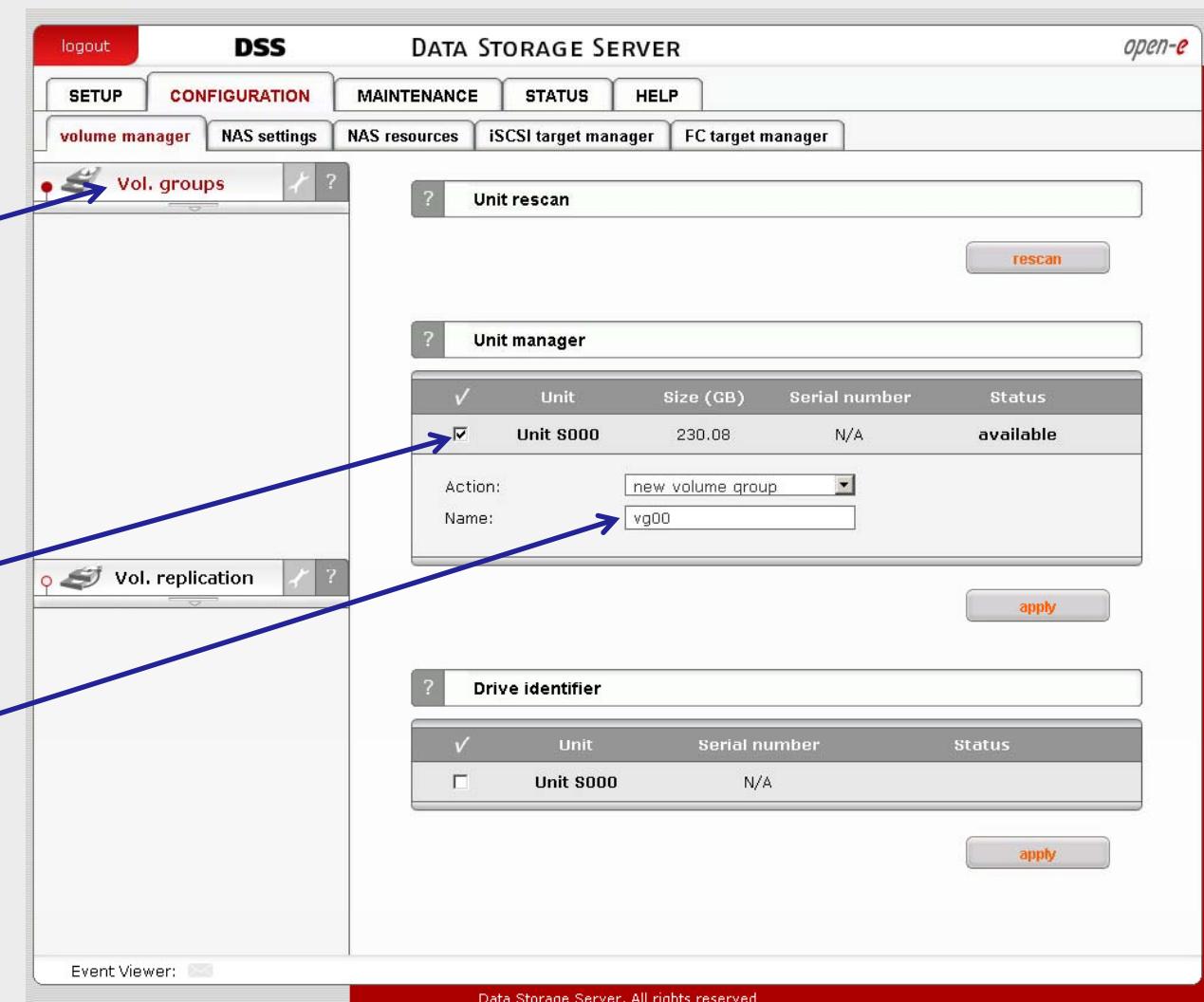
Data Storage Server. All rights reserved

Synchronous Volume Replication with Failover over a LAN

 Data Server (DSS2)
Secondary node
Address IP:192.168.0.221

2. Configure the Secondary node

 Under the „CONFIGURATION“ tab, select „volume manager“ and next Vol. Groups.


Screenshot of the DSS configuration interface. The top navigation bar includes: logout, DSS, CONFIGURATION (highlighted in red), MAINTENANCE, STATUS, and HELP. Sub-navigation tabs include: volume manager (highlighted in red), NAS settings, NAS resources, iSCSI target manager, and FC target manager. The main content area shows the "Vol. groups" section with a "Unit rescans" button and a "Unit manager" section. The "Unit manager" table lists a unit: Unit S000, Size (GB): 230.08, Serial number: N/A, Status: available. The "Action" dropdown is set to "new volume group" and the "Name" input field is set to "vg00". Buttons for "apply" and "cancel" are at the bottom. The bottom of the interface shows an "Event Viewer" and a red footer bar with the text "Data Storage Server. All rights reserved".

In Unit manager function add the selected physical units (Unit S000 or other) to create a new volume group (in this case, vg00) and click **apply** button

Synchronous Volume Replication with Failover over a LAN

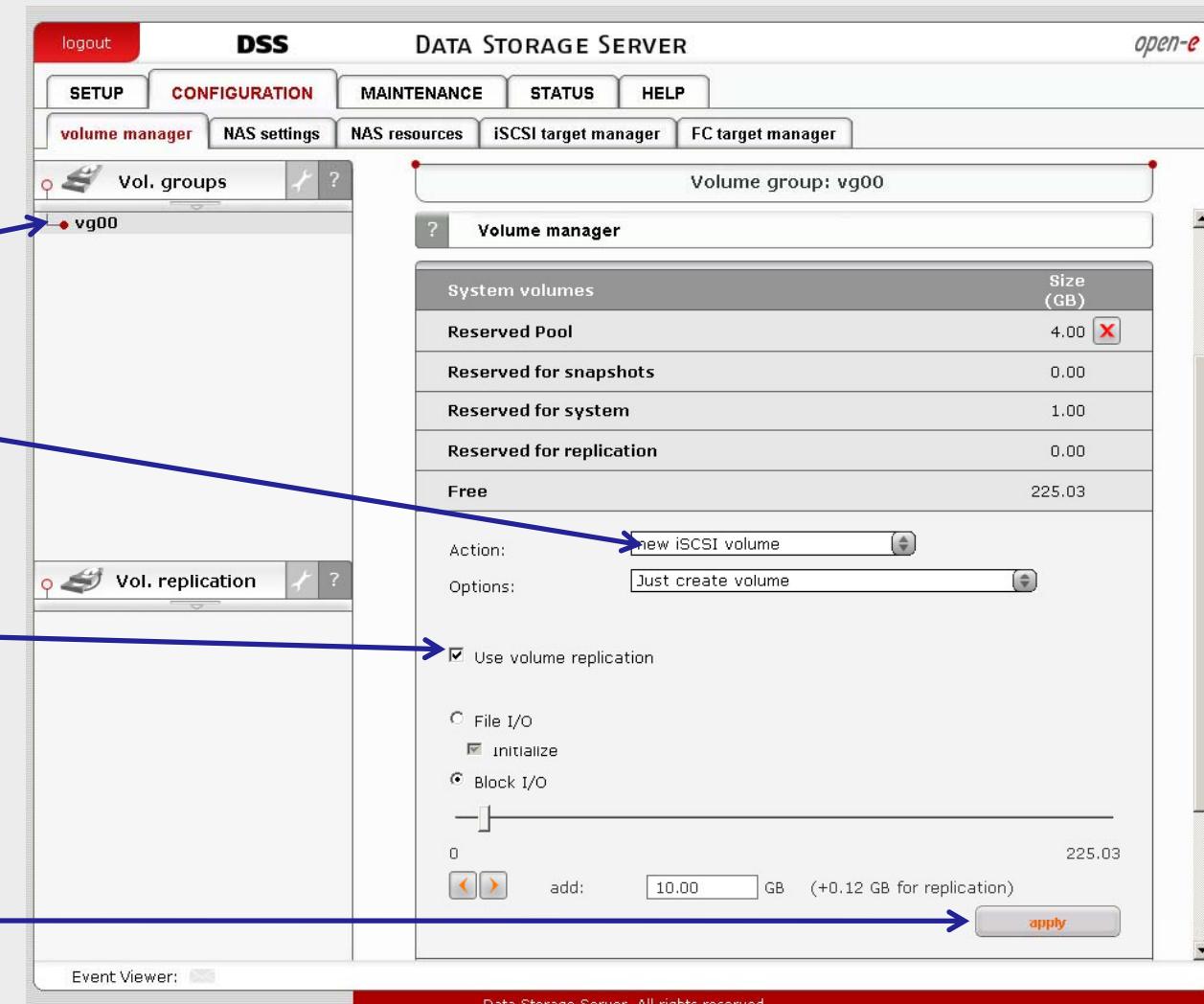
 Data Server (DSS2)
Secondary node
Address IP:192.168.0.221

2. Configure the Secondary node

Select the appropriate volume group (**vg00**) from the list on the left and create a **new iSCSI volume** of the required size. This logical volume will be the destination of the replication process.

Next check the box with **Use volume replication**

After assigning an appropriate amount of space for the iSCSI volume, click the **apply** button



Volume group: vg00

System volumes	Size (GB)
Reserved Pool	4.00
Reserved for snapshots	0.00
Reserved for system	1.00
Reserved for replication	0.00
Free	225.03

Action: new iSCSI volume

Options: Just create volume

Use volume replication

File I/O

Initialize

Block I/O

0

add: 10.00 GB (+0.12 GB for replication)

apply

Event Viewer: 

Data Storage Server, All rights reserved

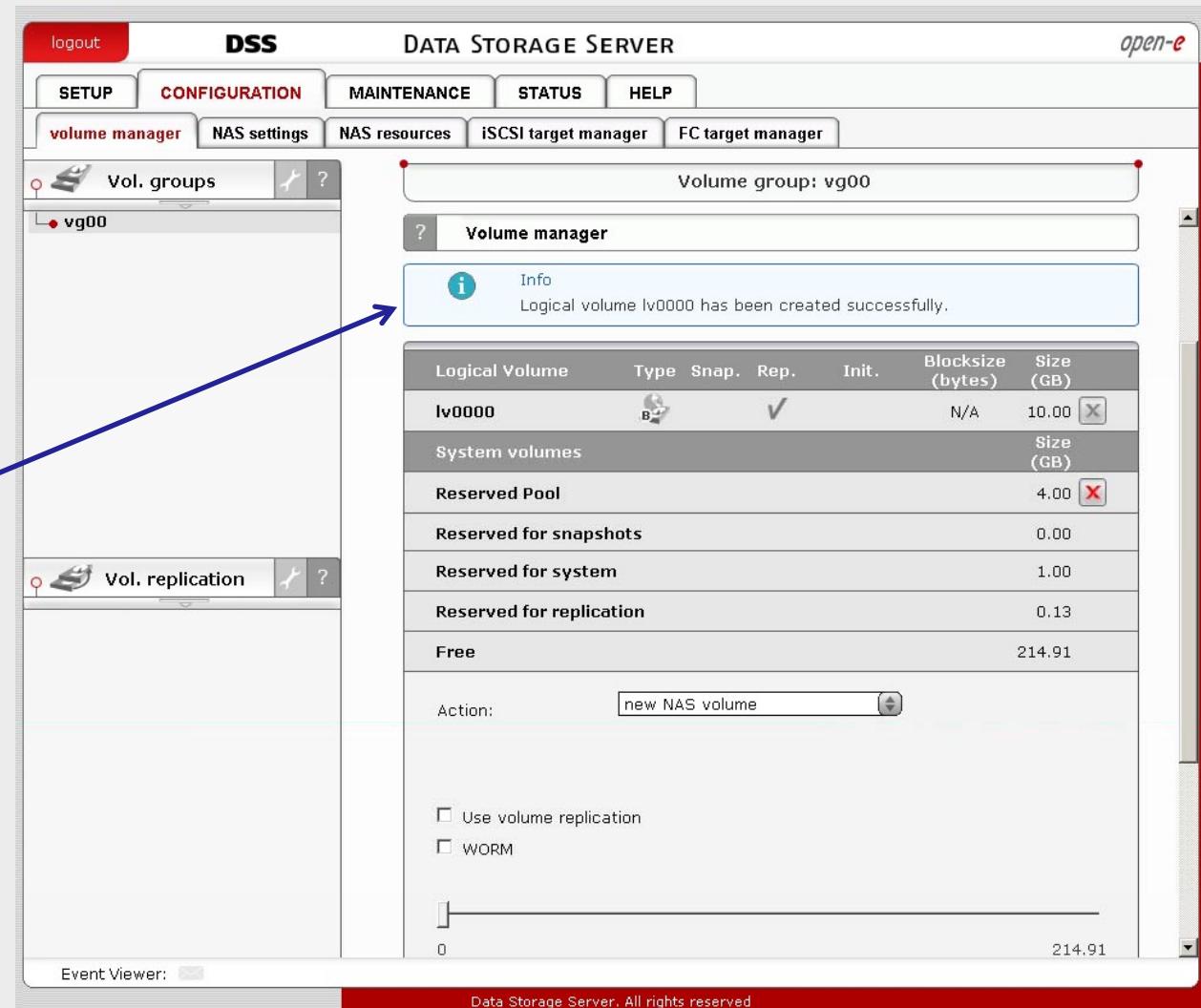
Synchronous Volume Replication with Failover over a LAN *open-e*

 Data Server (DSS2)
Secondary node
Address IP:192.168.0.221

2. Configure the Secondary node

The destination iSCSI Volume Block I/O is now configured.

 iSCSI volume (lv0000)


DSS DATA STORAGE SERVER
Logout **DSS** DATA STORAGE SERVER *open-e*
SETUP CONFIGURATION MAINTENANCE STATUS HELP
volume manager **NAS settings** NAS resources iSCSI target manager FC target manager
Vol. groups ?
vg00
Vol. replication ?
Volume group: vg00
Volume manager
Info
Logical volume lv0000 has been created successfully.
Logical Volume Type Snap. Rep. Init. Blocksize (bytes) Size (GB)
lv0000 B ✓ N/A 10.00
System volumes
Reserved Pool 4.00
Reserved for snapshots 0.00
Reserved for system 1.00
Reserved for replication 0.13
Free 214.91
Action: new NAS volume
 Use volume replication
 WORM
0 214.91
Event Viewer:
Data Storage Server. All rights reserved

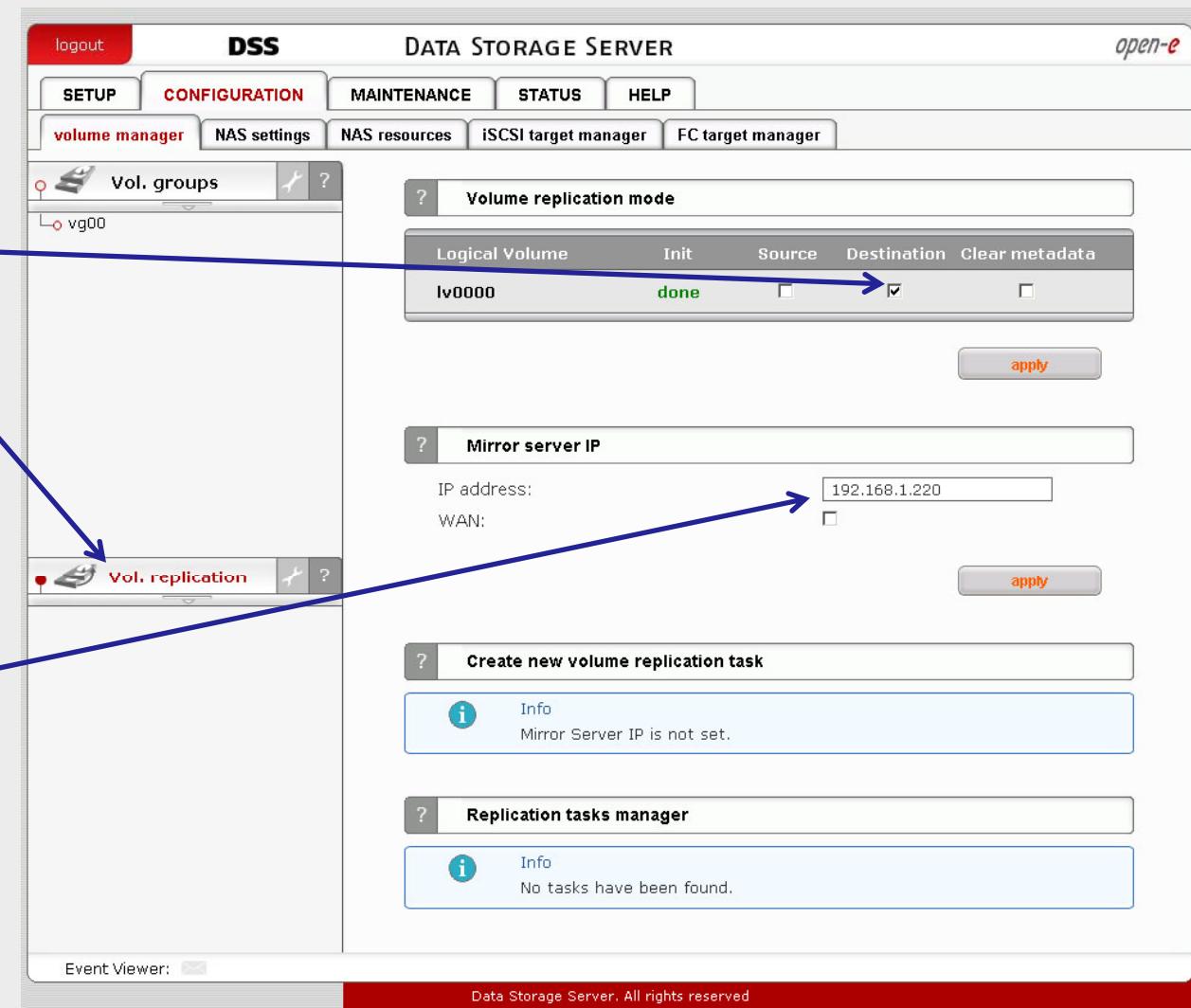
Synchronous Volume Replication with Failover over a LAN

 Data Server (DSS2)
Secondary node
Address IP:192.168.0.221

Now, select the **Vol. replication** and check the box under **Destination** and click the **apply** button

Next, under **Mirror Server IP** function, enter the IP address of the Primary node (in our example, this would be 192.168.1.220) and click the **apply** button

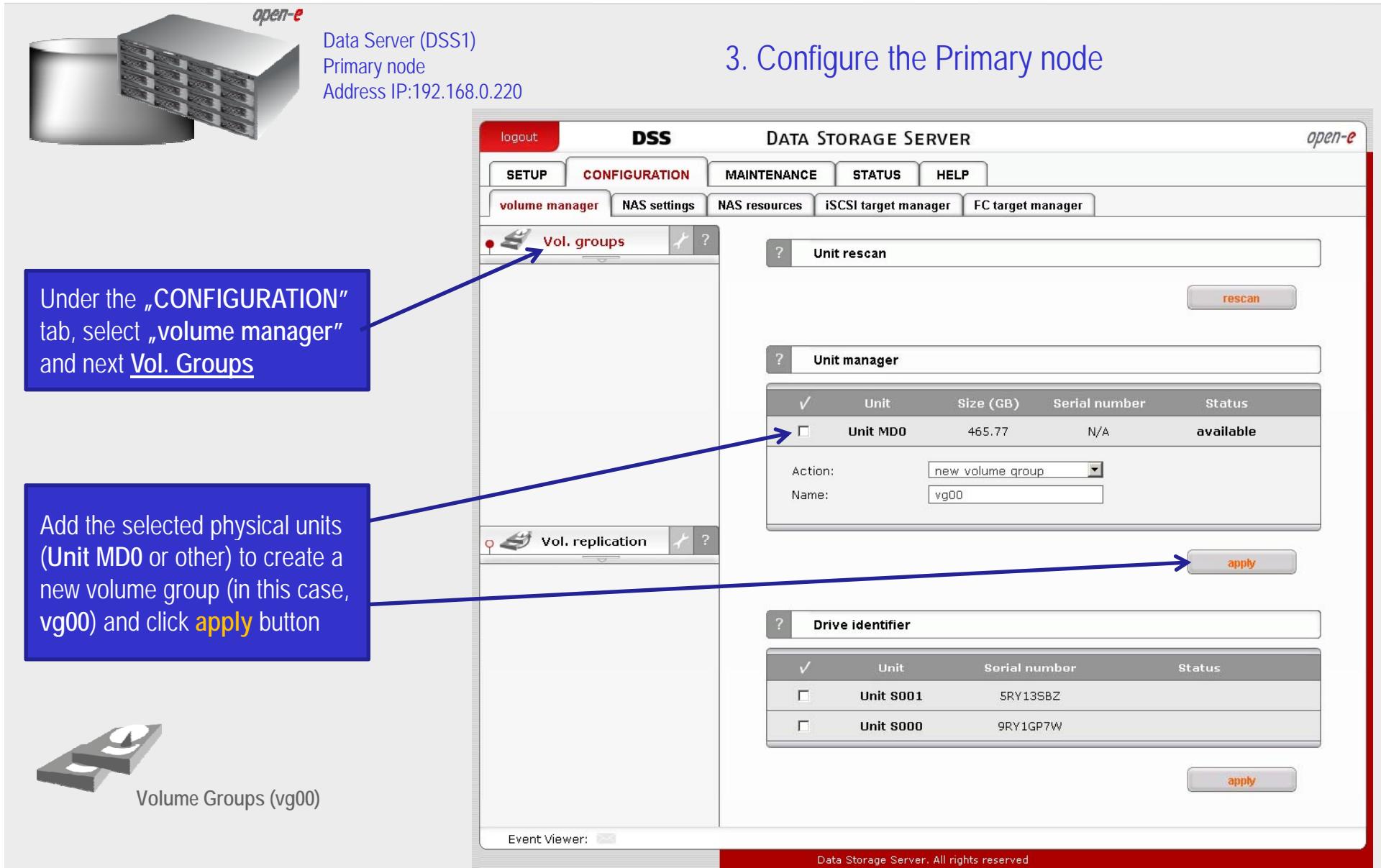
2. Configure the Secondary node



NOTE:
The Mirror server IP Address must be on the same subnet in order for the replication to communicate. VPN connections can work providing you are not using a NAT. Please follow example:

- Source: 192.168.1.220
- Destination: 192.168.1.221

Synchronous Volume Replication with Failover over a LAN



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

3. Configure the Primary node

Under the „CONFIGURATION“ tab, select „volume manager“ and next Vol. Groups

Add the selected physical units (Unit MDO or other) to create a new volume group (in this case, vg00) and click **apply** button

Volume Groups (vg00)

DSS DATA STORAGE SERVER

CONFIGURATION tab selected.

Unit manager screen:

Unit	Size (GB)	Serial number	Status
Unit MDO	465.77	N/A	available

Action: new volume group
Name: vg00

Drive identifier screen:

Unit	Serial number	Status
Unit S001	5RY13SBZ	
Unit S000	9RY1GP7W	

apply button highlighted.

Synchronous Volume Replication with Failover over a LAN

open-e

Data Server (DSS1)
Primary node
Address IP:192.168.0.220

3. Configure the Primary node

The screenshot shows the DSS web interface with the 'CONFIGURATION' tab selected. On the left, there are two tabs: 'volume manager' (which is active) and 'Vol. replication'. The 'volume manager' tab displays a list of volume groups, with 'vg00' selected. The 'Vol. replication' tab is currently empty. The main right panel is titled 'Volume manager' and shows the following details:

System volumes	Size (GB)
Reserved Pool	4.00
Reserved for snapshots	0.00
Reserved for system	1.00
Reserved for replication	0.00
Free	460.72

Action: new iSCSI volume
Options: Just create volume
 Use volume replication
 File I/O
 Initialize
 Block I/O
0
add: 10.00 GB (+0.12 GB for replication)
apply

Event Viewer: Data Storage Server. All rights reserved

NOTE:
The source and destination volumes must be of identical size.

Select the appropriate volume group (vg00) from the list on the left and create a **new iSCSI volume** of the required size. This logical volume will be the destination of the replication process

Next, check box **Use volume replication**

After assigning an appropriate amount of space for the iSCSI volume, click the **apply** button

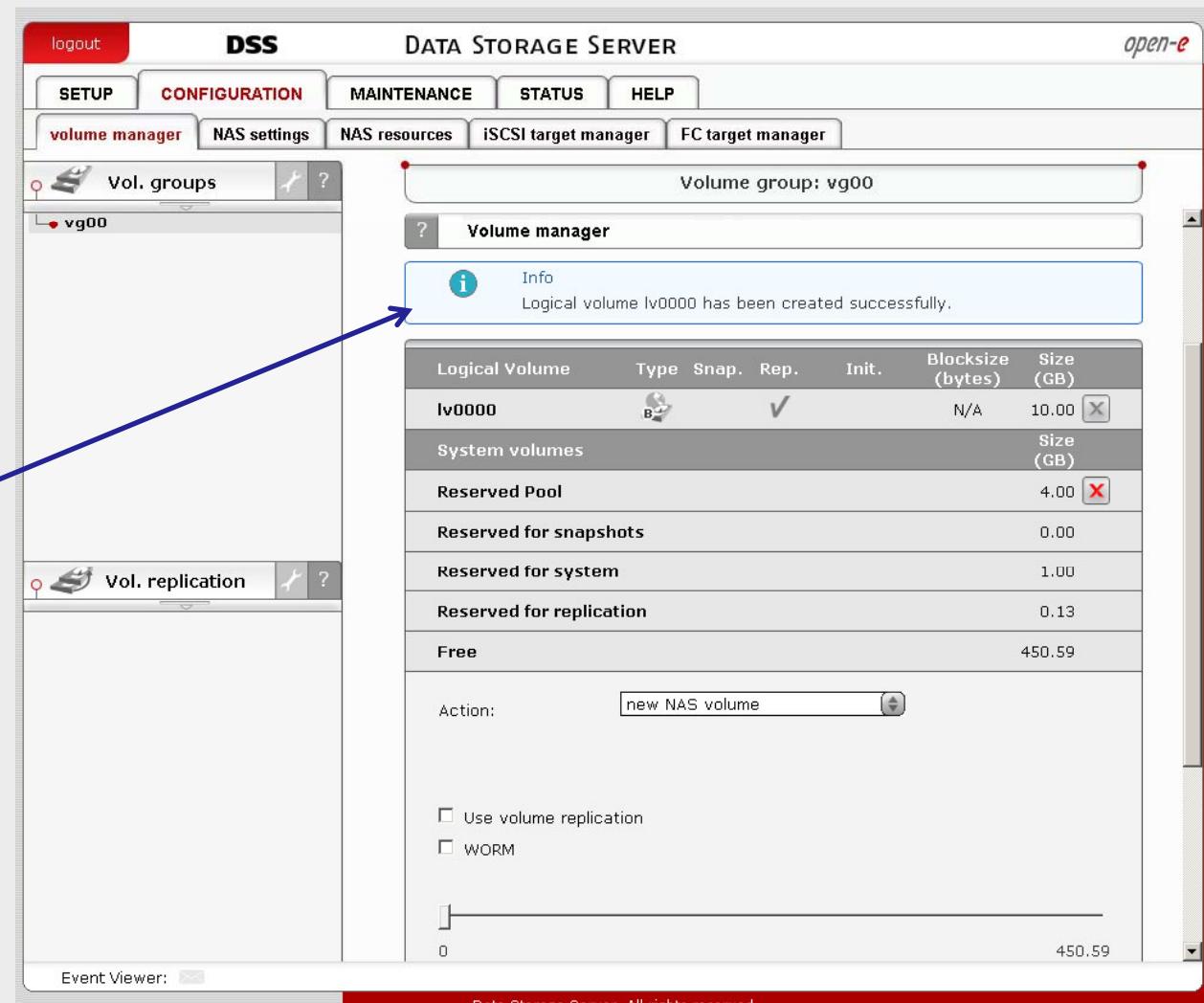
Synchronous Volume Replication with Failover over a LAN

 Data Server (DSS1)
Primary node
Address IP:192.168.0.220

3. Configure the Primary node

The destination iSCSI Volume Block I/O is now configured.

 iSCSI volume (lv0000)


Screenshot of the open-e DSS web interface showing the Volume manager configuration for the iSCSI volume. The interface includes tabs for SETUP, CONFIGURATION, MAINTENANCE, STATUS, and HELP, and sub-tabs for volume manager, NAS settings, NAS resources, iSCSI target manager, and FC target manager. The main content area shows a volume group 'vg00' and a logical volume 'lv0000' with a size of 10.00 GB. A success message indicates 'Logical volume lv0000 has been created successfully.' A blue box on the left states 'The destination iSCSI Volume Block I/O is now configured.' with an arrow pointing to the 'lv0000' entry in the table.

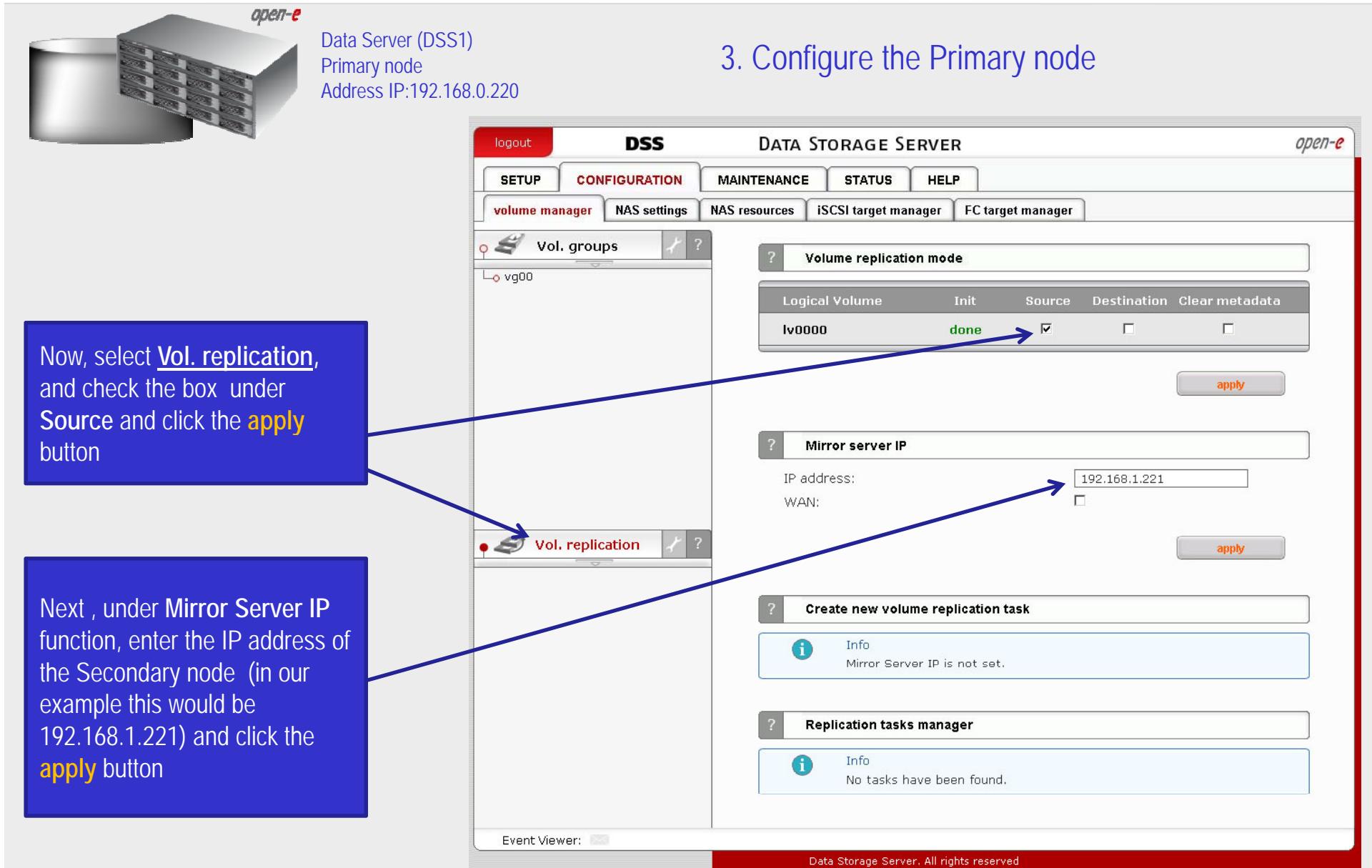
Logical Volume	Type	Snap.	Rep.	Init.	Blocksize (bytes)	Size (GB)
lv0000			✓		N/A	10.00 
System volumes						Size (GB)
						4.00 
						0.00
						1.00
						0.13
Reserved for replication						450.59
Free						450.59
Action: new NAS volume						

Use volume replication
 WORM

Event Viewer: 

Data Storage Server. All rights reserved

Synchronous Volume Replication with Failover over a LAN



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

3. Configure the Primary node

Now, select **Vol. replication**, and check the box under **Source** and click the **apply** button

Next, under **Mirror server IP** function, enter the IP address of the Secondary node (in our example this would be 192.168.1.221) and click the **apply** button

DSS DATA STORAGE SERVER

logout **CONFIGURATION** MAINTENANCE STATUS HELP

volume manager NAS settings NAS resources iSCSI target manager FC target manager

Vol. groups vg00

Volume replication mode

Logical Volume	Init	Source	Destination	Clear metadata
lv0000	done	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

apply

Mirror server IP

IP address: 192.168.1.221

WAN:

apply

Create new volume replication task

Info: Mirror Server IP is not set.

Replication tasks manager

Info: No tasks have been found.

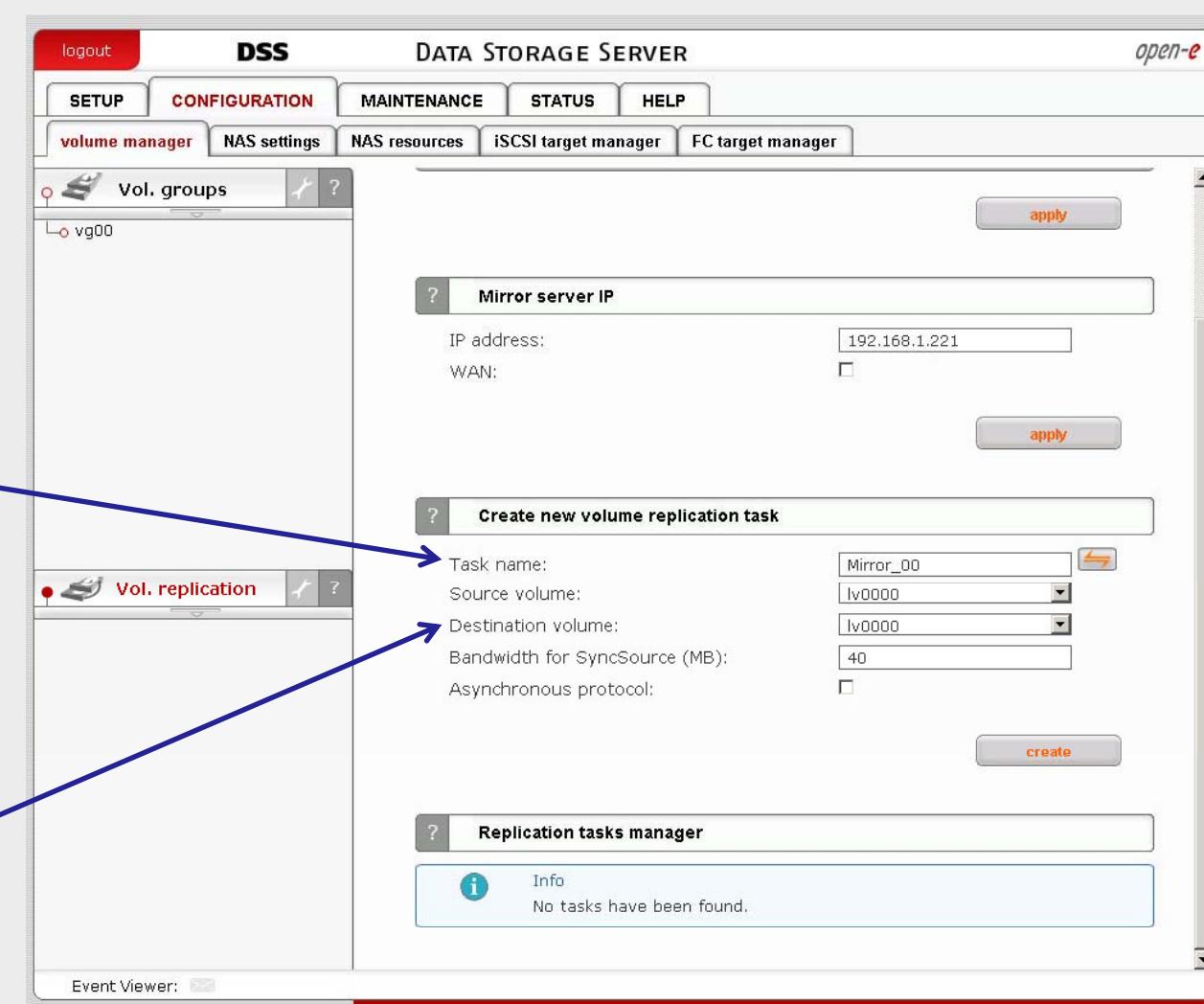
Event Viewer:

Data Storage Server, All rights reserved

Synchronous Volume Replication with Failover over a LAN

 Data Server (DSS1)
Primary node
Address IP:192.168.0.220

3. Configure the Primary node



The screenshot shows the DSS (Data Storage Server) web interface. The top navigation bar includes 'logout', 'DSS', 'CONFIGURATION' (which is selected), 'MAINTENANCE', 'STATUS', and 'HELP'. Below the navigation is a sub-menu with 'volume manager' (selected), 'NAS settings', 'NAS resources', 'iSCSI target manager', and 'FC target manager'. The main content area has a 'Vol. groups' section showing 'vg00'. To the right, there are two configuration panels: 'Mirror server IP' and 'Create new volume replication task'. The 'Mirror server IP' panel has 'IP address: 192.168.1.221' and a 'WAN' checkbox. The 'Create new volume replication task' panel has a 'Task name: Mirror_00' field with a back arrow button, a 'Source volume: lv0000' dropdown, a 'Destination volume: lv0000' dropdown, a 'Bandwidth for SyncSource (MB): 40' input field, and an 'Asynchronous protocol' checkbox. Below these panels is a 'Replication tasks manager' section with an 'Info' box stating 'No tasks have been found.' At the bottom, there is an 'Event Viewer' section and a red footer bar with the text 'Data Storage Server, All rights reserved'.

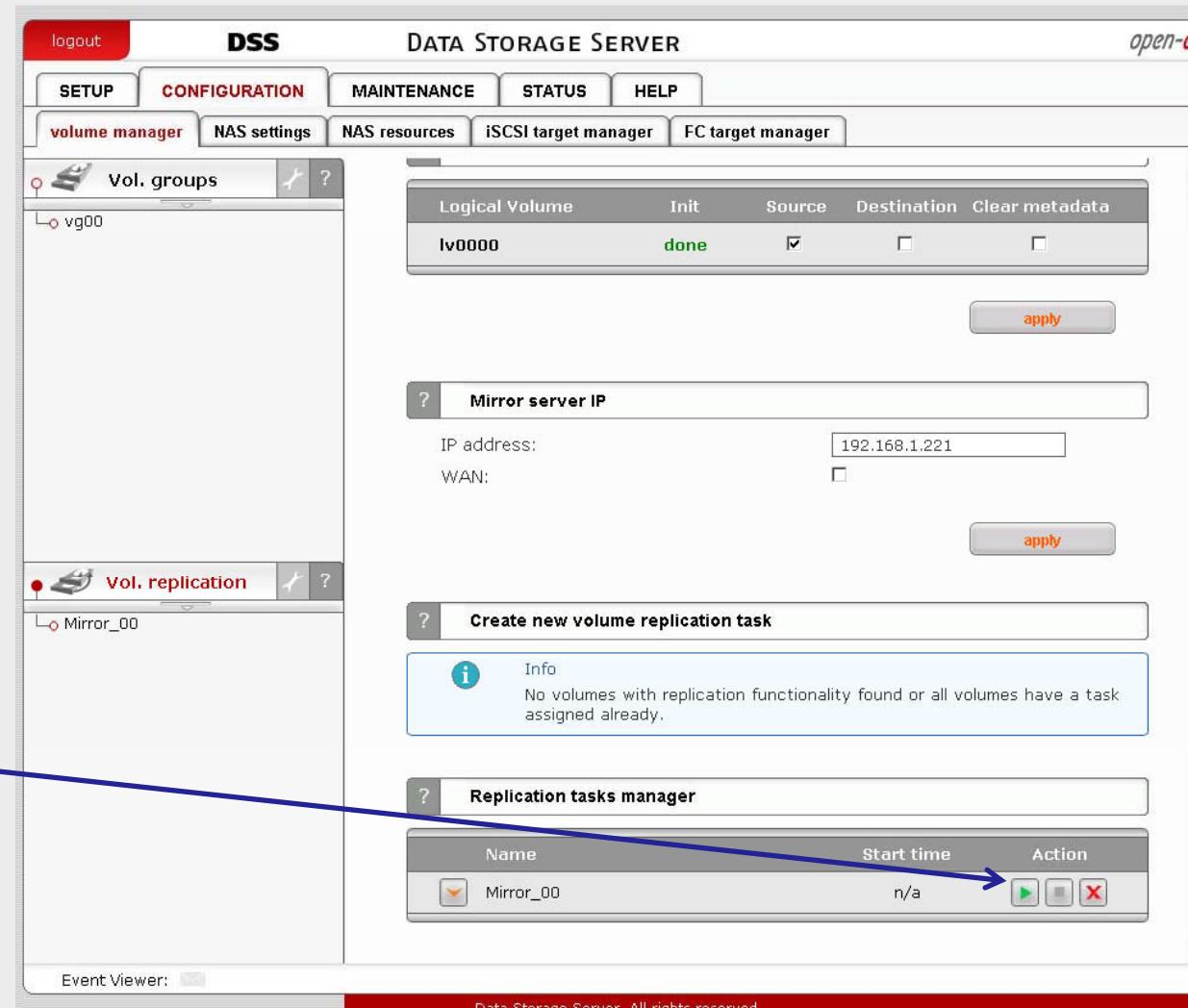
Enter the task name in field **Task name** next click on the button 

In the **Destination volume** field select the appropriate volume (in this example, **lv0000**) and click **create** to confirm.

Synchronous Volume Replication with Failover over a LAN *open-e*

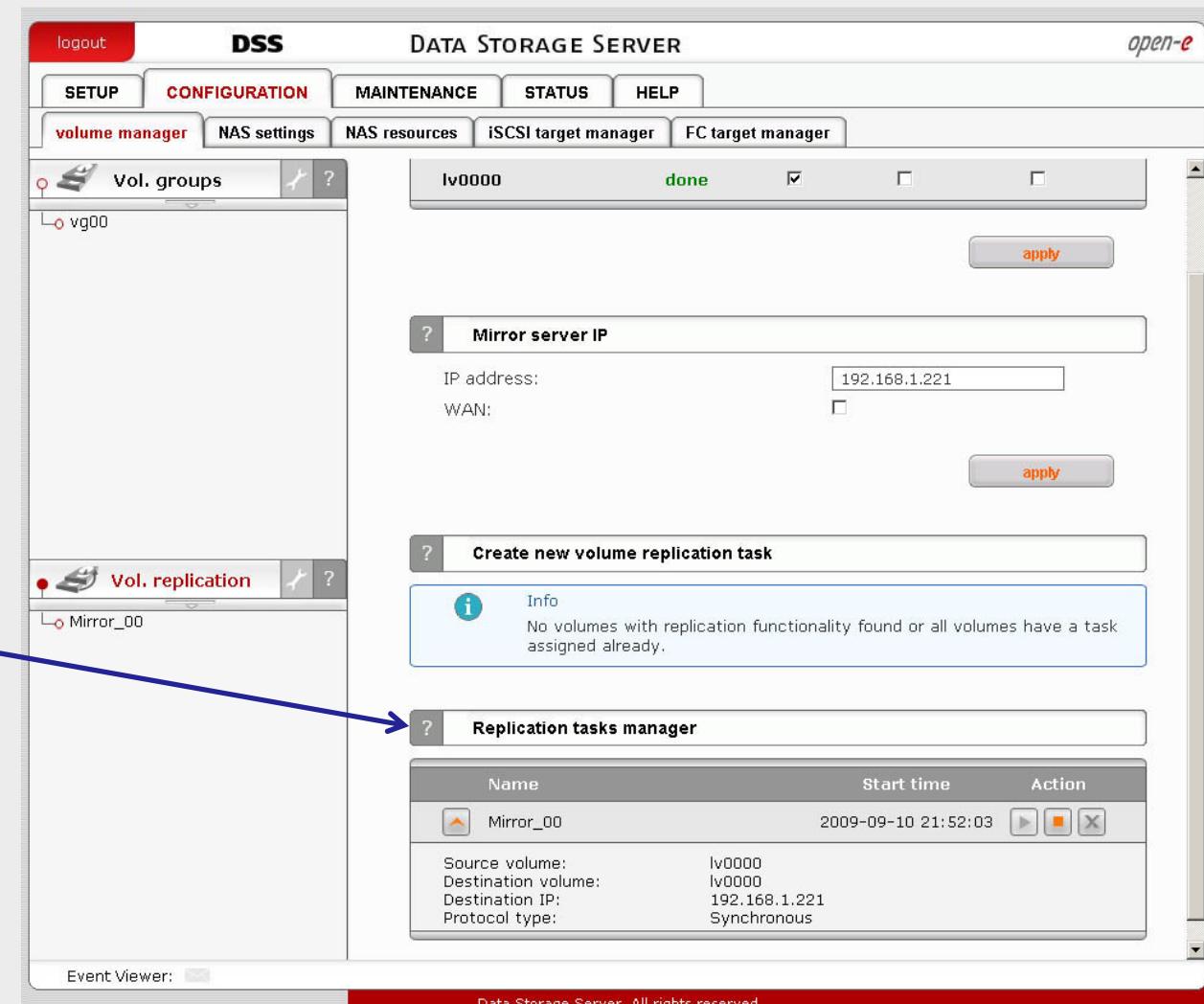
 Data Server (DSS1)
Primary node
Address IP:192.168.0.220

3. Configure the Primary node



Now, in the **Replication task manager** function, click on  button under to start the Replication task on the Primary node

Synchronous Volume Replication with Failover over a LAN



The screenshot shows the DSS (Data Storage Server) interface with the following details:

- Header:** open-e
- Left Sidebar:** Data Server (DSS1), Primary node, Address IP:192.168.0.220
- Central Area:** DSS - DATA STORAGE SERVER
- Top Navigation:** logout, SETUP, **CONFIGURATION**, MAINTENANCE, STATUS, HELP
- Sub-Navigation:** volume manager, **NAS settings**, NAS resources, iSCSI target manager, FC target manager
- Left Panel:** Vol. groups (vg00), Vol. replication (Mirror_00)
- Right Panel:**
 - Volume Configuration:** lv0000, done, **apply**
 - Mirror server IP:** IP address: 192.168.1.221, WAN: **apply**
 - Create new volume replication task:** Info: No volumes with replication functionality found or all volumes have a task assigned already.
 - Replication tasks manager:** Name: Mirror_00, Start time: 2009-09-10 21:52:03, Action:

Name	Start time	Action
Source volume: lv0000	Destination volume: lv0000	Protocol type: Synchronous
Destination IP: 192.168.1.221		
- Bottom:** Event Viewer: Data Storage Server, All rights reserved

In the Replication tasks manager function information is available about the current running replication task.

Synchronous Volume Replication with Failover over a LAN

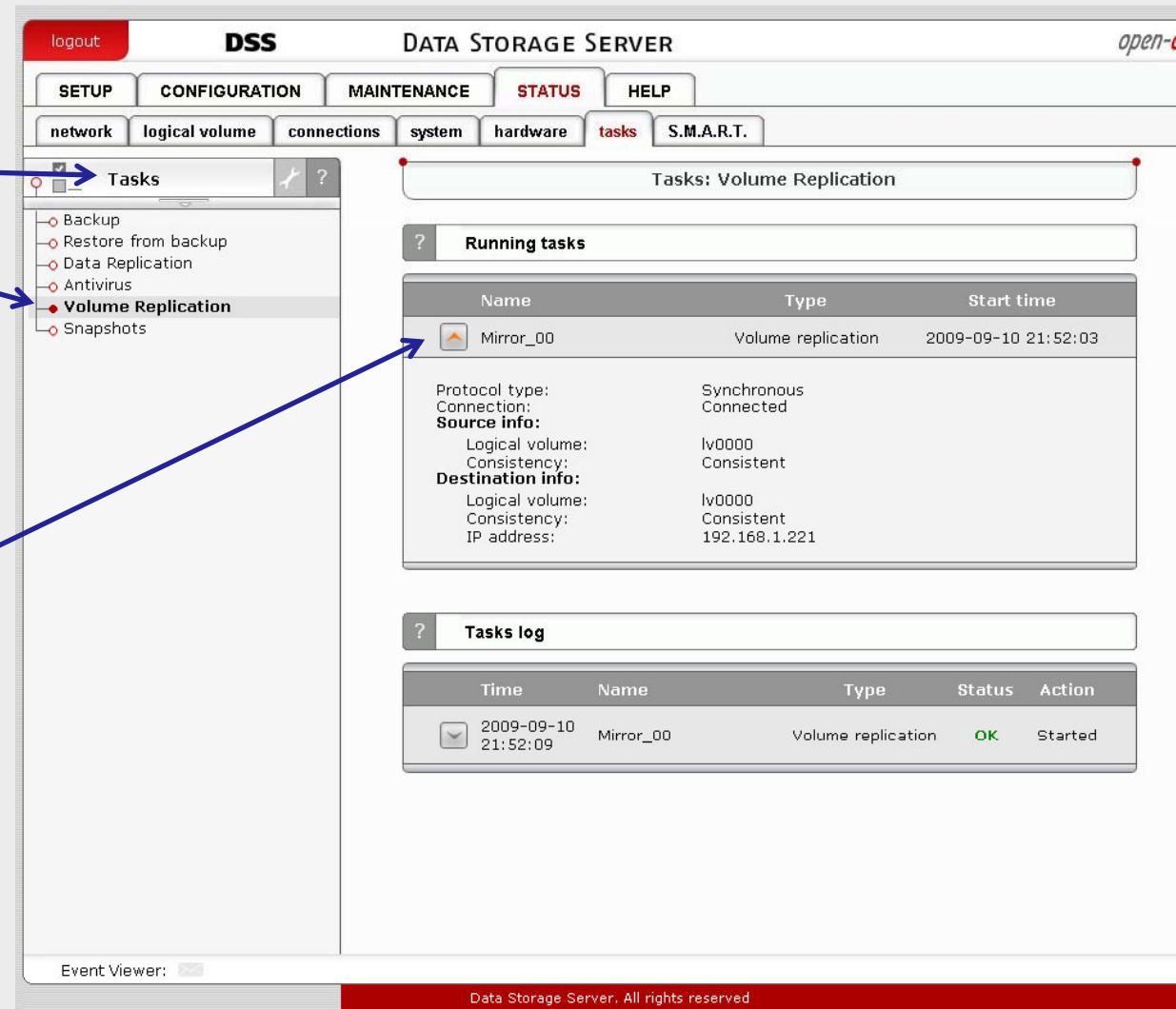


Data Server (DSS1)
Primary node
Address IP:192.168.0.220

3. Configure the Primary node

Under the „STATUS“ tab,
select „Tasks“ and Volume
Replication

Click on the  button with
task name (in this case
Mirror_00) to display detailed
information on the current
replication task



The screenshot shows the DSS (Data Storage Server) web interface. The top navigation bar includes links for logout, DSS, SETUP, CONFIGURATION, MAINTENANCE, STATUS (which is highlighted in red), HELP, network, logical volume, connections, system, hardware, tasks (which is highlighted in red), and S.M.A.R.T. The main content area is titled "Tasks" and shows a list of tasks: Backup, Restore from backup, Data Replication, Antivirus, Volume Replication (which is selected and highlighted in red), and Snapshots. To the right of this list is a detailed view of the "Volume Replication" task named "Mirror_00". The details show: Protocol type: Synchronous, Connection: Connected, Source info: Logical volume: lv0000, Consistency: Consistent, Destination info: Logical volume: lv0000, Consistency: Consistent, IP address: 192.168.1.221. Below this is a "Tasks log" section with a table:

Time	Name	Type	Status	Action
2009-09-10 21:52:09	Mirror_00	Volume replication	OK	Started

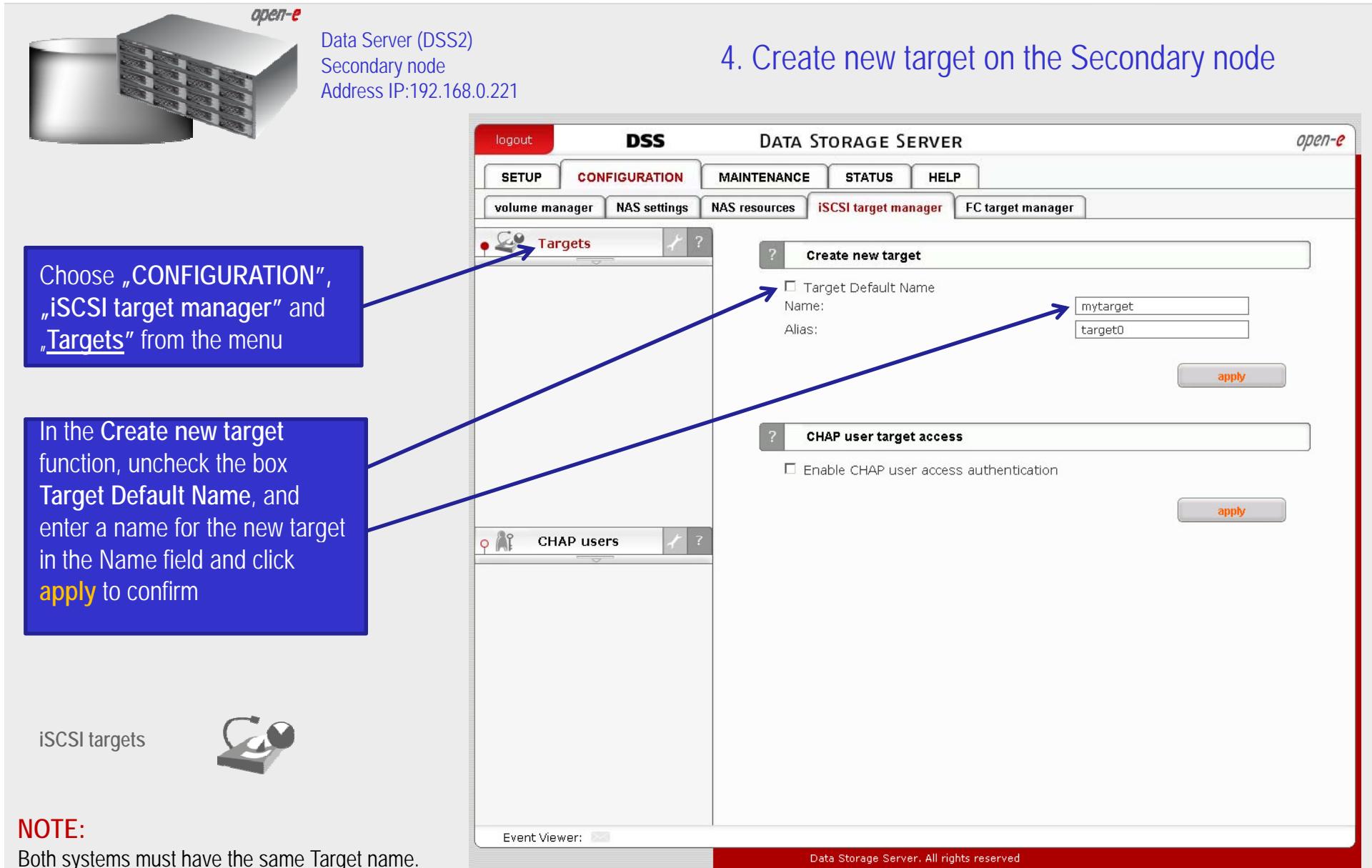
At the bottom of the interface, there is an "Event Viewer" section and a footer that reads "Data Storage Server. All rights reserved".

NOTE:

Please allow the replication task to complete
similar to above with status being “Consistent”
before writing to the iSCSI Logical Volume.

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Synchronous Volume Replication with Failover over a LAN



4. Create new target on the Secondary node

Choose „CONFIGURATION“, „iSCSI target manager“ and „Targets“ from the menu

In the Create new target function, uncheck the box **Target Default Name, and enter a name for the new target in the Name field and click **apply** to confirm**

NOTE:
Both systems must have the same Target name.

Event Viewer: 

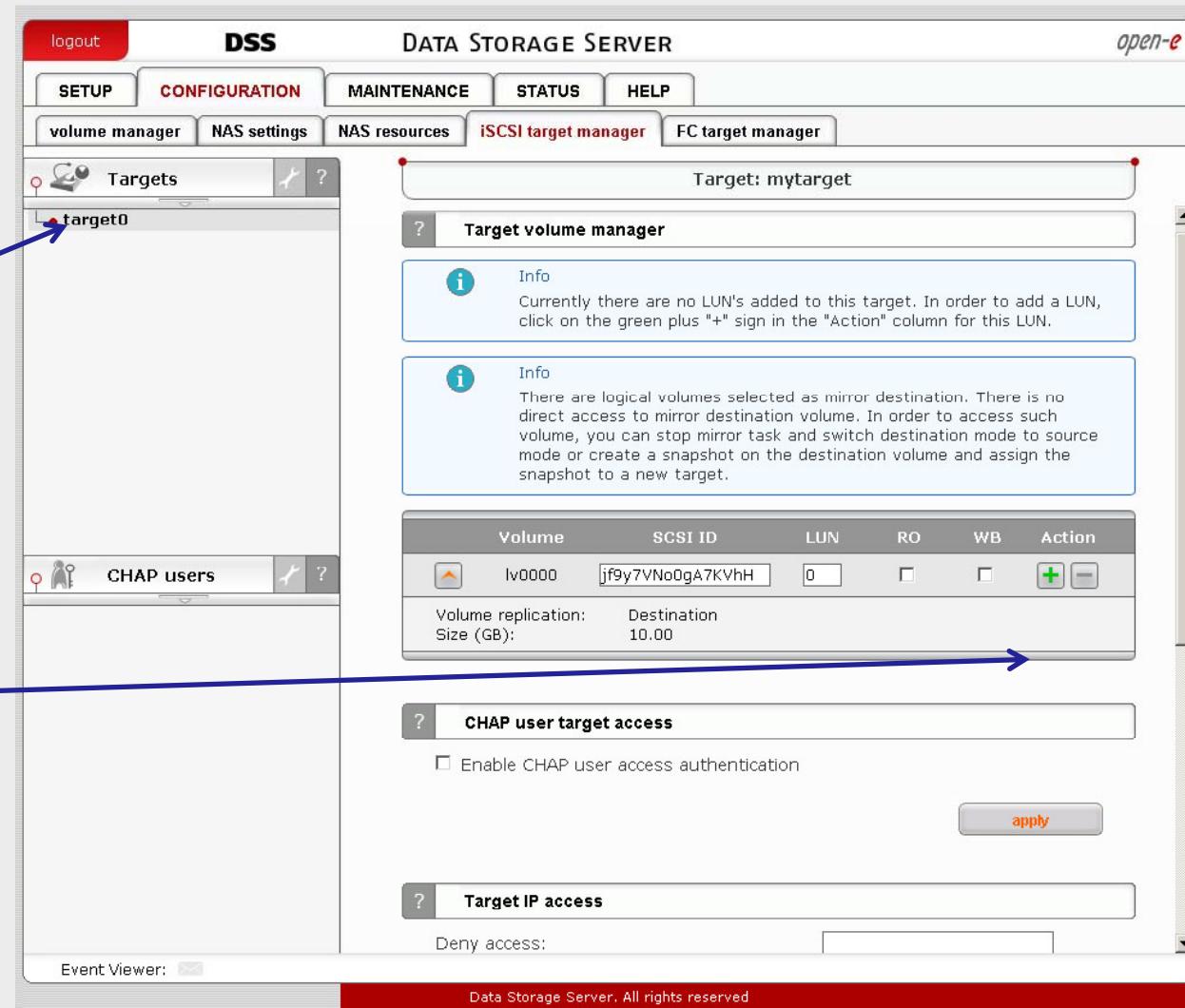
Data Storage Server, All rights reserved

Synchronous Volume Replication with Failover over a LAN



Data Server (DSS2)
Secondary node
Address IP:192.168.0.221

4. Create new target on the Secondary node



Select target0 within the Targets field.

To assign a volume to the target, click the button  located under Action.

NOTE:
Both systems must have the same SCSI ID and LUN#

WARNING:
Please do not switch on the write back (WB) cache !

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Synchronous Volume Replication with Failover over a LAN

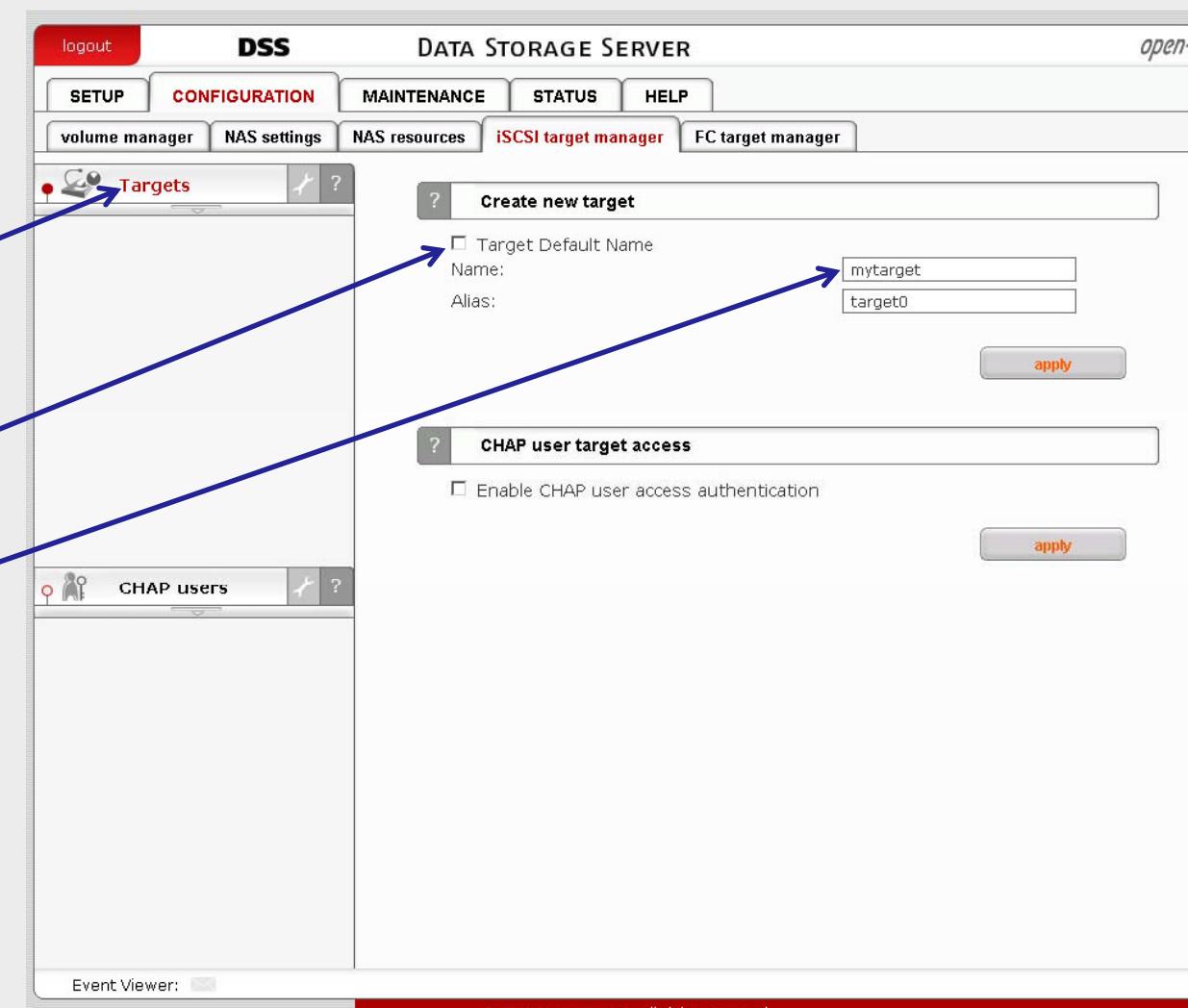
 Data Server (DSS1)
Primary node
Address IP:192.168.0.220

5. Create new target on the Primary node

Choose „CONFIGURATION“ and „iSCSI target manager“ and „Targets“ from the menu

In the Create new target function, uncheck the box Target Default Name, and enter a name for the new target in the Name field and click apply to confirm

 iSCSI targets

 The screenshot shows the DSS Data Storage Server interface. The top navigation bar includes links for logout, SETUP, **CONFIGURATION**, MAINTENANCE, STATUS, and HELP. Below the navigation bar are tabs for volume manager, NAS settings, NAS resources, **iSCSI target manager** (which is currently selected), and FC target manager. A sub-menu for Targets is open, showing a list of existing targets. A modal window titled "Create new target" is displayed, containing fields for "Name:" (set to "mytarget") and "Alias:" (set to "target0"). There is also a checkbox for "Target Default Name" which is unchecked. At the bottom of the modal are "apply" and "cancel" buttons. Below the modal, another sub-menu for CHAP users is visible. The bottom of the interface shows an "Event Viewer" section and a red footer bar with the text "Data Storage Server, All rights reserved".

NOTE:
Both systems must have the same Target name.

Synchronous Volume Replication with Failover over a LAN

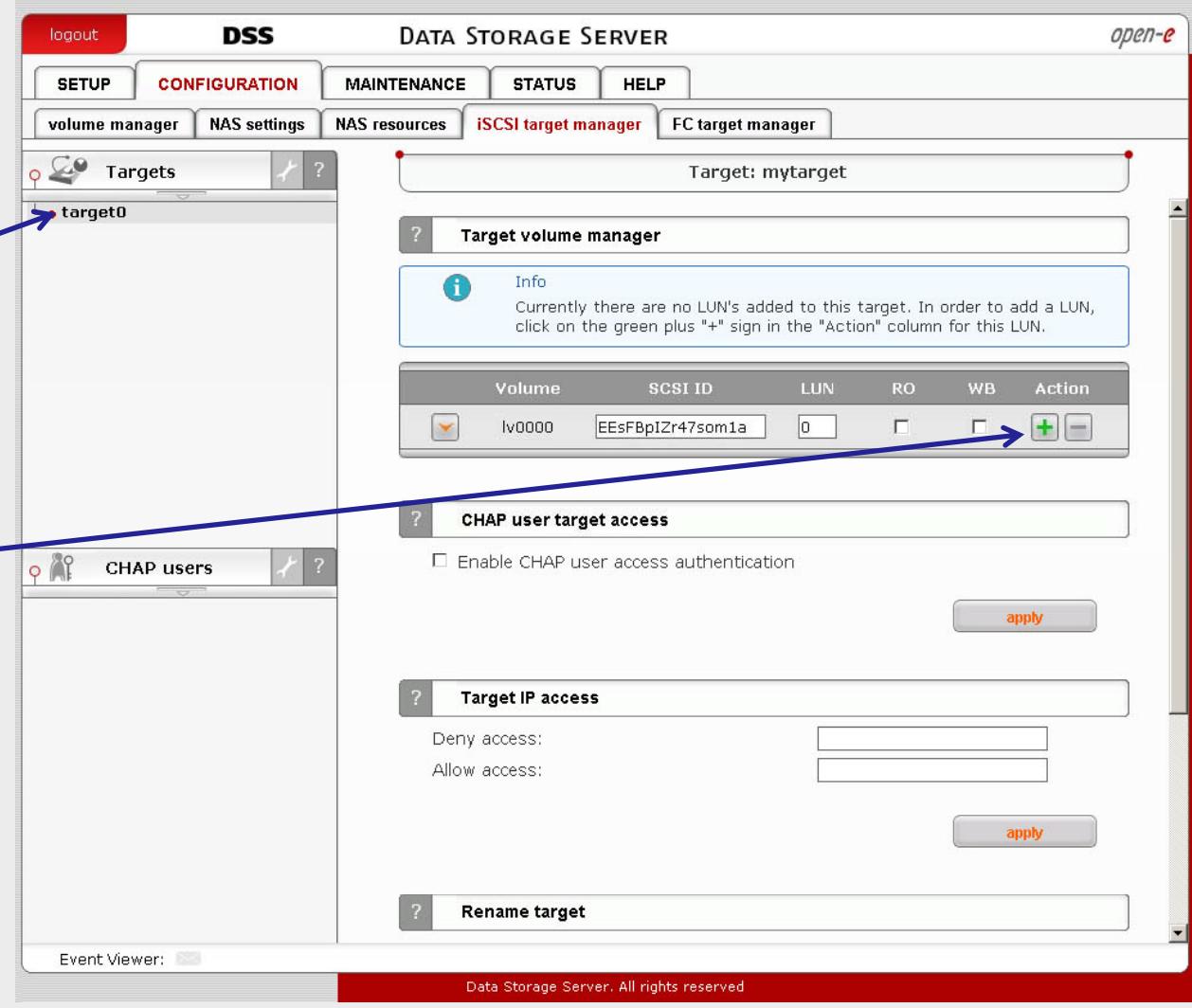
 Data Server (DSS1)
Primary node
Address IP:192.168.0.220

5. Create new target on the Primary node

Select the target0 within the Targets field

To assign a volume to the target, click the button  located under Action.

WARNING:
Please do not switch on the write back cache (WB) !



DSS DATA STORAGE SERVER **open-e**

logout **CONFIGURATION** MAINTENANCE STATUS HELP

volume manager **iSCSI target manager** FC target manager

Targets

Volume	SCSI ID	LUN	RO	WB	Action
lv0000	EEsFBpIZr47som1a	0	<input type="checkbox"/>	<input type="checkbox"/>	

Target: mytarget

Target volume manager

Info
Currently there are no LUN's added to this target. In order to add a LUN, click on the green plus "+" sign in the "Action" column for this LUN.

CHAP user target access

Enable CHAP user access authentication **apply**

Target IP access

Deny access:
Allow access:
apply

Rename target

Event Viewer: 

Data Storage Server. All rights reserved

Synchronous Volume Replication with Failover over a LAN *open-e*

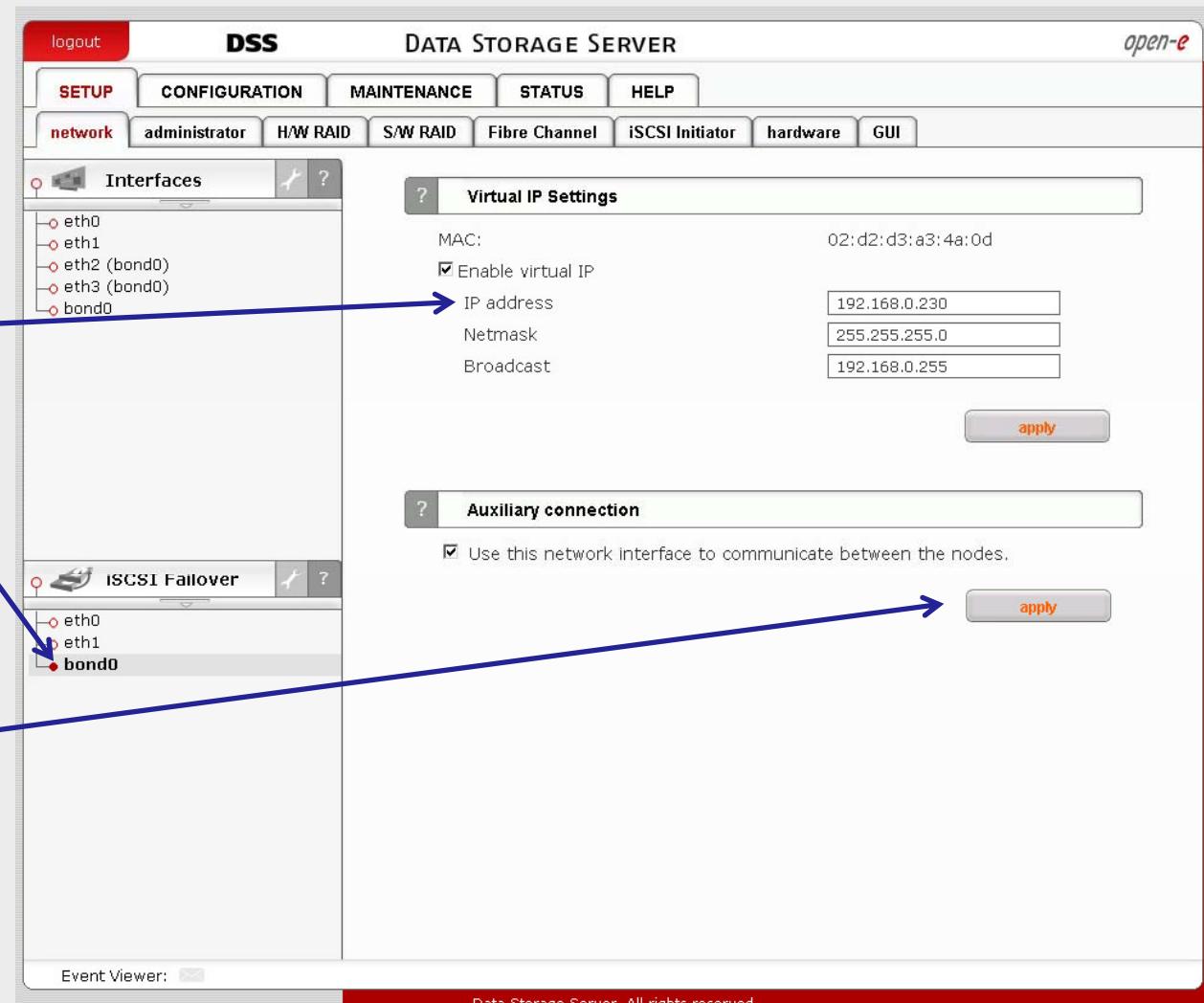
 Data Server (DSS1)
Primary node
Address IP:192.168.0.220

Now, select the bond0 within **iSCSI Failover**.
In the **Virtual IP Settings** function check box **Enable virtual IP** and enter IP address, Netmask, Broadcast, and click the **apply** button.

In the **Auxiliary connection** function check box **Use this network interface to communicate between the nodes** and click the **apply** button.

NOTE:
There need to be at least two *auxiliary connections*. The interface with the virtual IP can also serve as one of the auxiliary connections. Please set the Virtual IP Address in a different network subnet then the physical IP Address. To have additional iSCSI Failover systems, please set this pair in a different network subnet from the other iSCSI Failover systems. This limitation will be removed in the future.

6. Configure Virtual IP and Auxillary connection



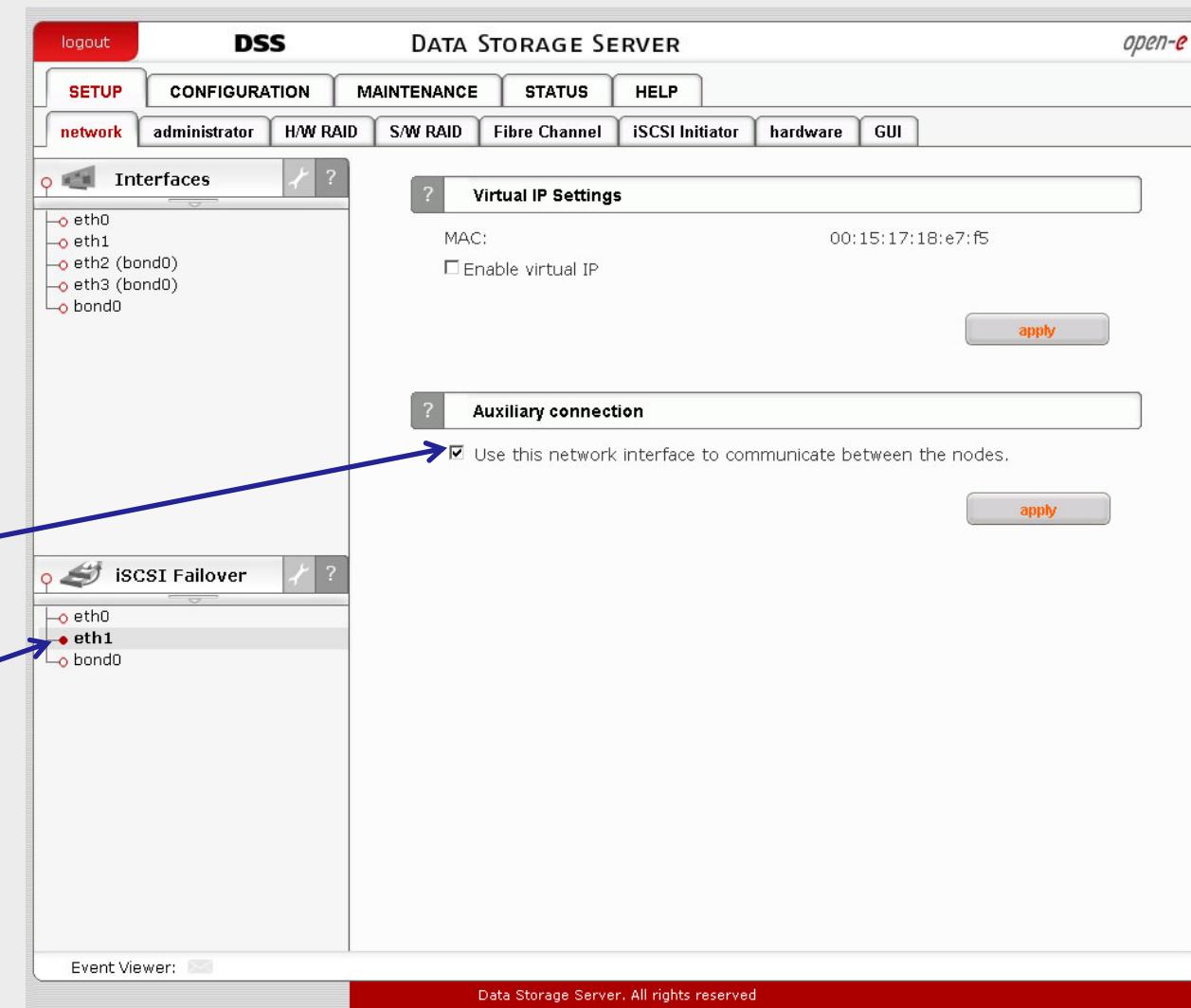
The screenshot shows the DSS (Data Storage Server) interface with the following details:

- Virtual IP Settings:** MAC: 02:d2:d3:a3:4a:0d, Enable virtual IP, IP address: 192.168.0.230, Netmask: 255.255.255.0, Broadcast: 192.168.0.255. An **apply** button is present.
- Auxiliary connection:** Use this network interface to communicate between the nodes. An **apply** button is present.

Synchronous Volume Replication with Failover over a LAN *open-e*

Data Server (DSS1)
Primary node
Address IP:192.168.0.220

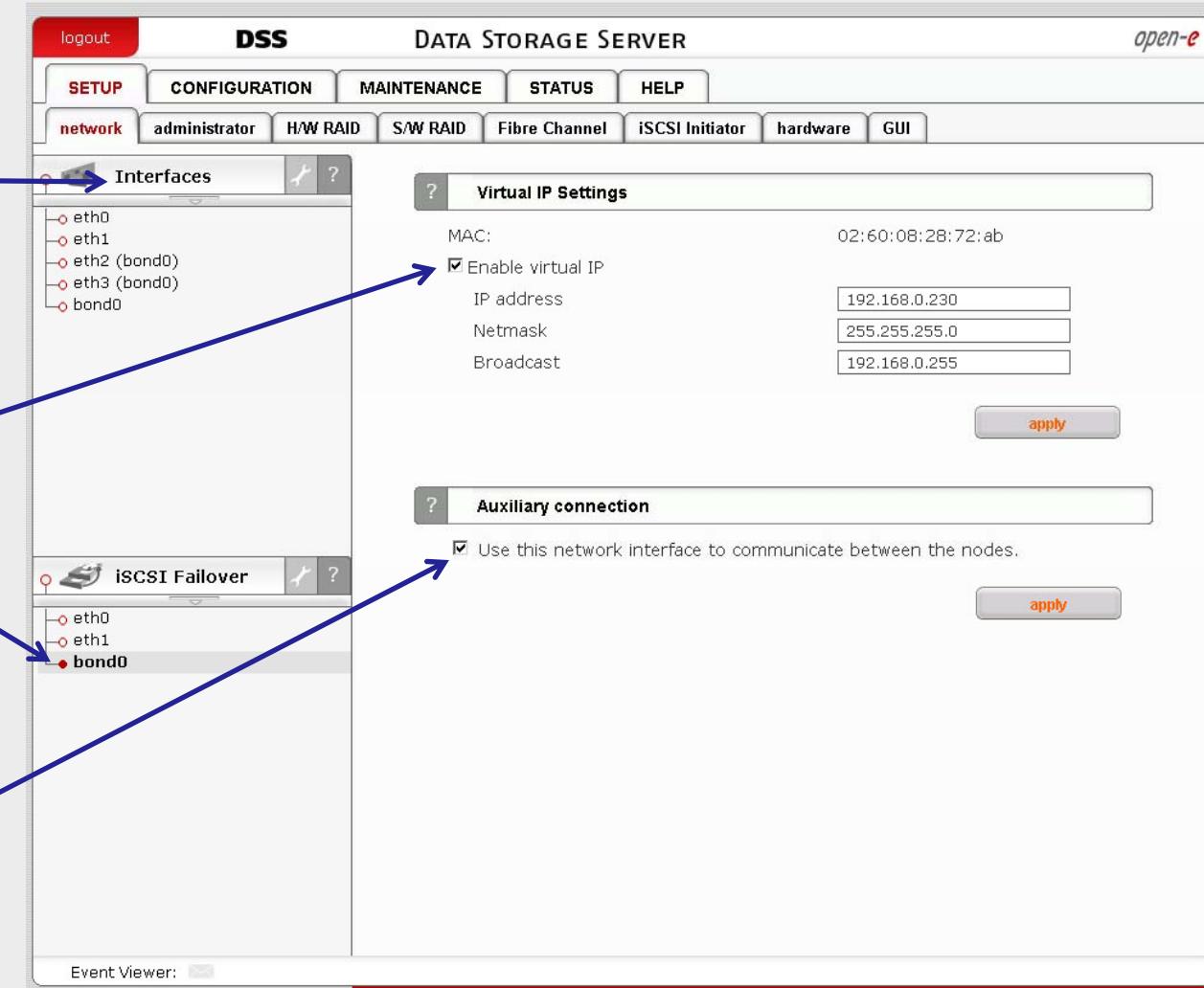
6. Configure Virtual IP and Auxillary connection



Now, select the eth1 within **iSCSI Failover**.
In the **Auxiliary connection** function check box **Use this network interface** to communicate between the nodes and click the **apply** button.

Event Viewer: Data Storage Server. All rights reserved

Synchronous Volume Replication with Failover over a LAN



6. Configure Virtual IP and Auxillary connection

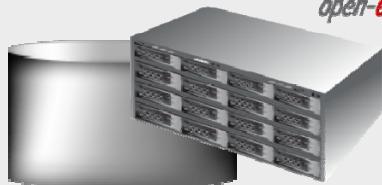
Data Server (DSS2)
Secondary node
Address IP:192.168.0.221

Choose, „SETUP“ and „network“ and „Interface“ from the menu

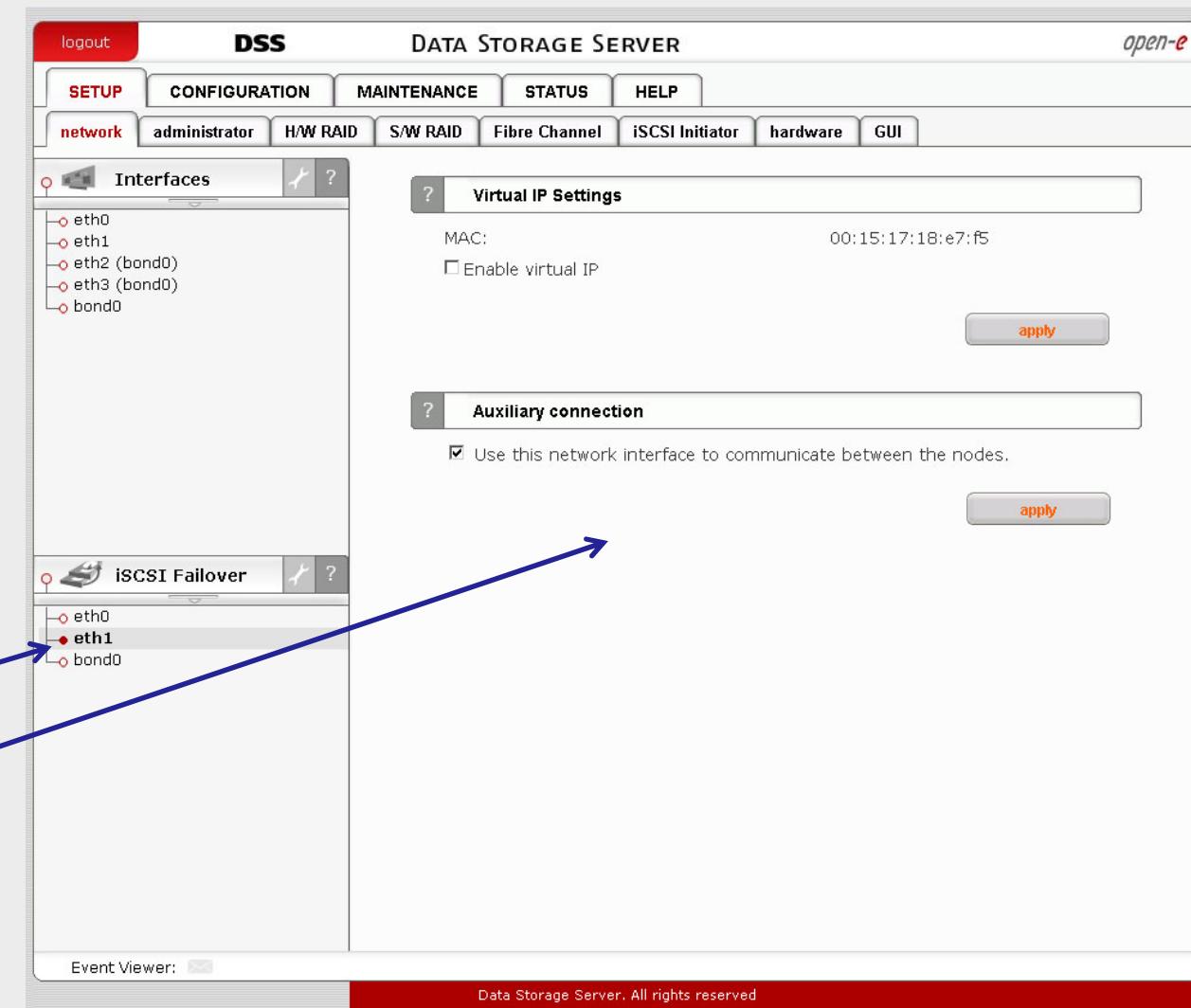
Now, select the bond0 within iSCSI Failover. In the **Virtual IP Settings** function check the box **Enable virtual IP** and enter IP address, Netmask, Broadcast, and click the **apply** button.

In the **Auxiliary connection** function check box **Use this network interface to communicate between the nodes** and click the **apply** button.

Synchronous Volume Replication with Failover over a LAN *open-e*

 Data Server (DSS2)
Secondary node
Address IP:192.168.0.221

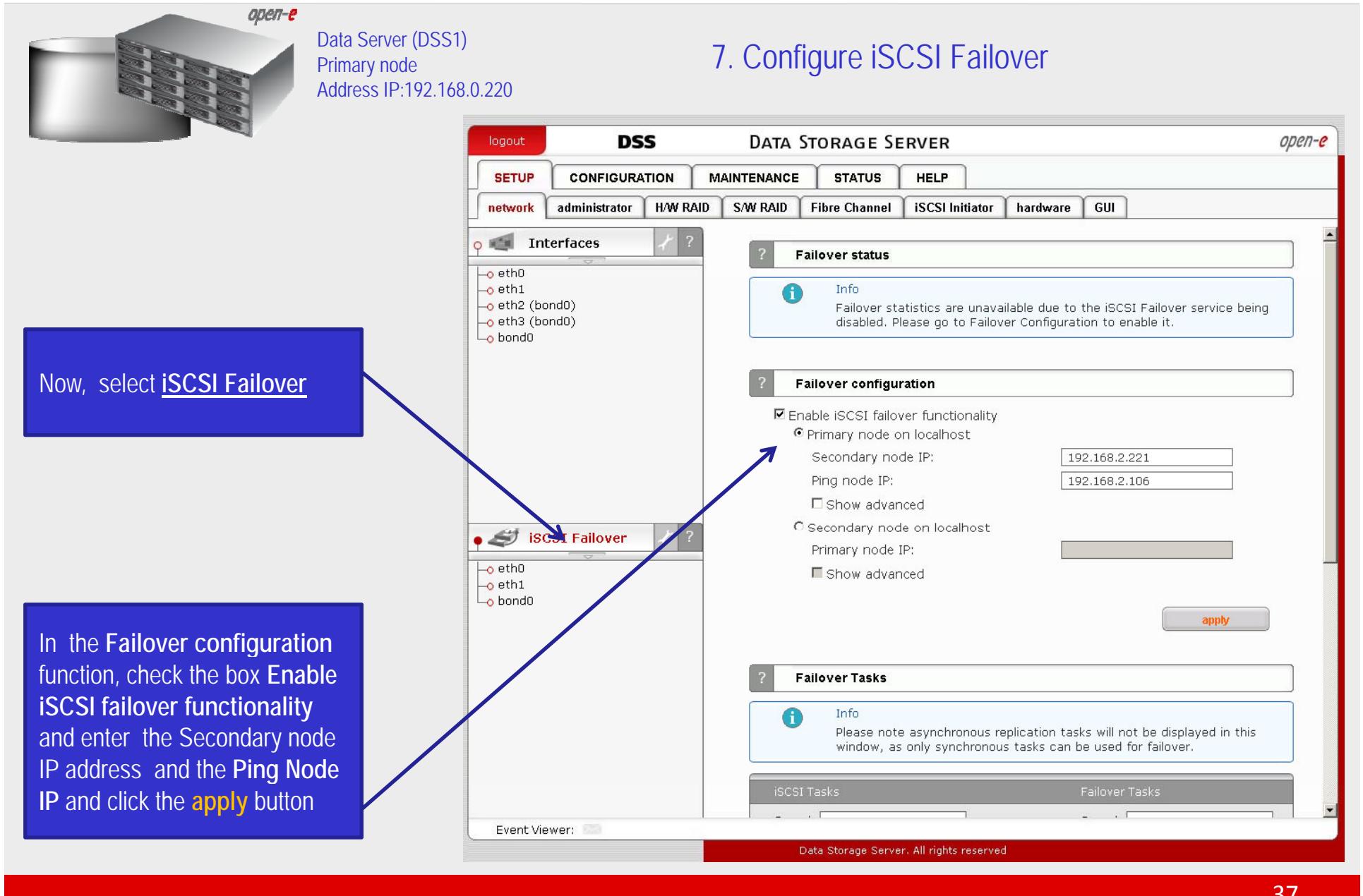
6. Configure Virtual IP and Auxillary connection



Now, select the eth1 within **iSCSI Failover**.
In the **Auxiliary connection** function check box **Use this network interface** to communicate between the nodes and click the **apply** button.

Event Viewer: Data Storage Server. All rights reserved

Synchronous Volume Replication with Failover over a LAN



7. Configure iSCSI Failover

Now, select iSCSI Failover

In the Failover configuration function, check the box **Enable iSCSI failover functionality** and enter the Secondary node IP address and the **Ping Node IP** and click the **apply** button

Data Server (DSS1)
Primary node
Address IP:192.168.0.220

DSS DATA STORAGE SERVER

SETUP **CONFIGURATION** **MAINTENANCE** **STATUS** **HELP**

network administrator H/W RAID S/W RAID Fibre Channel iSCSI Initiator hardware GUI

Interfaces

- eth0
- eth1
- eth2 (bond0)
- eth3 (bond0)
- bond0

iSCSI Failover

- eth0
- eth1
- bond0

Failover status

Info
Failover statistics are unavailable due to the iSCSI Failover service being disabled. Please go to Failover Configuration to enable it.

Failover configuration

Enable iSCSI failover functionality

Primary node on localhost
Secondary node IP:
Ping node IP:
 Show advanced

Secondary node on localhost
Primary node IP:
 Show advanced

apply

Failover Tasks

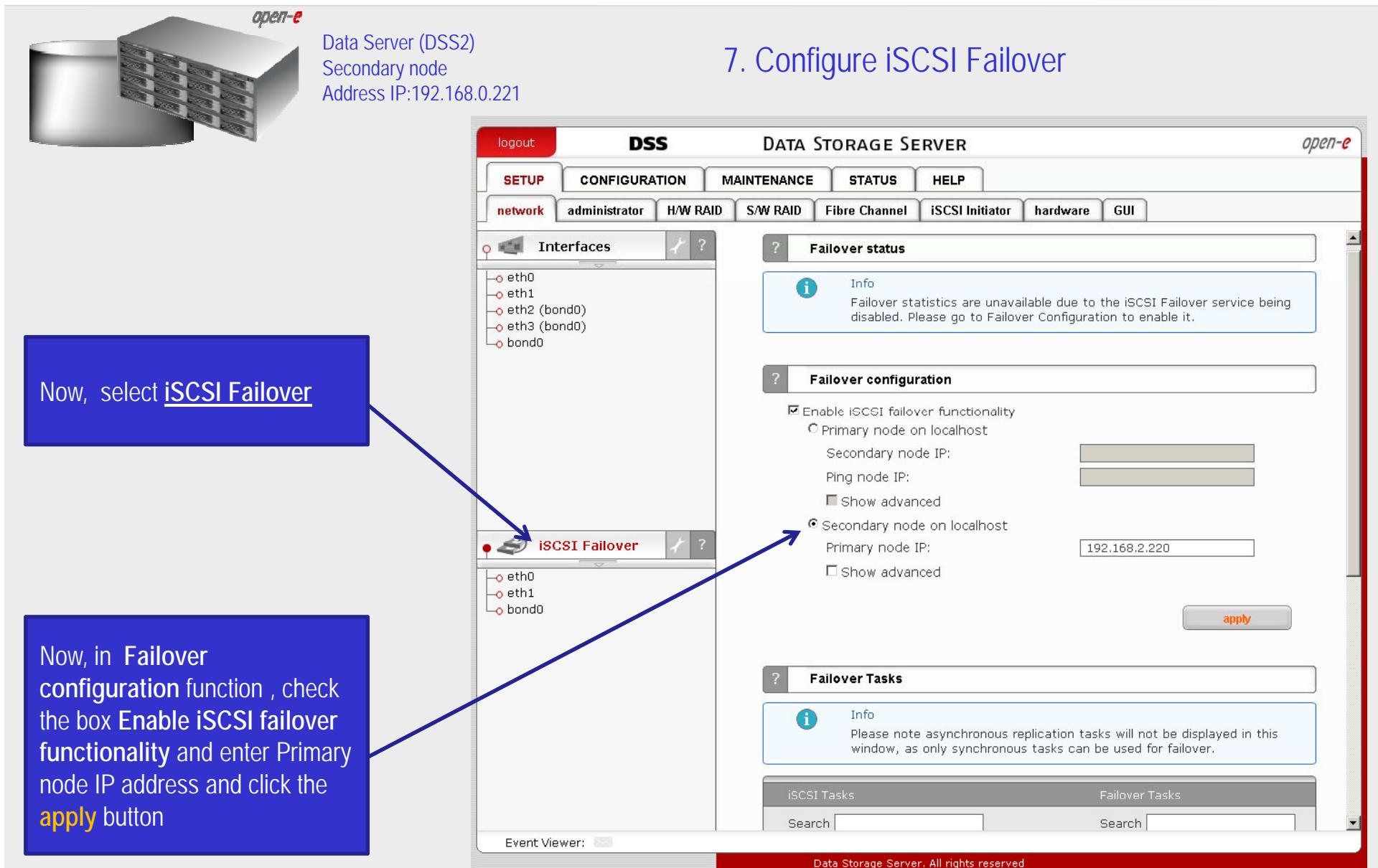
Info
Please note asynchronous replication tasks will not be displayed in this window, as only synchronous tasks can be used for failover.

iSCSI Tasks **Failover Tasks**

Event Viewer:

Data Storage Server. All rights reserved

Synchronous Volume Replication with Failover over a LAN



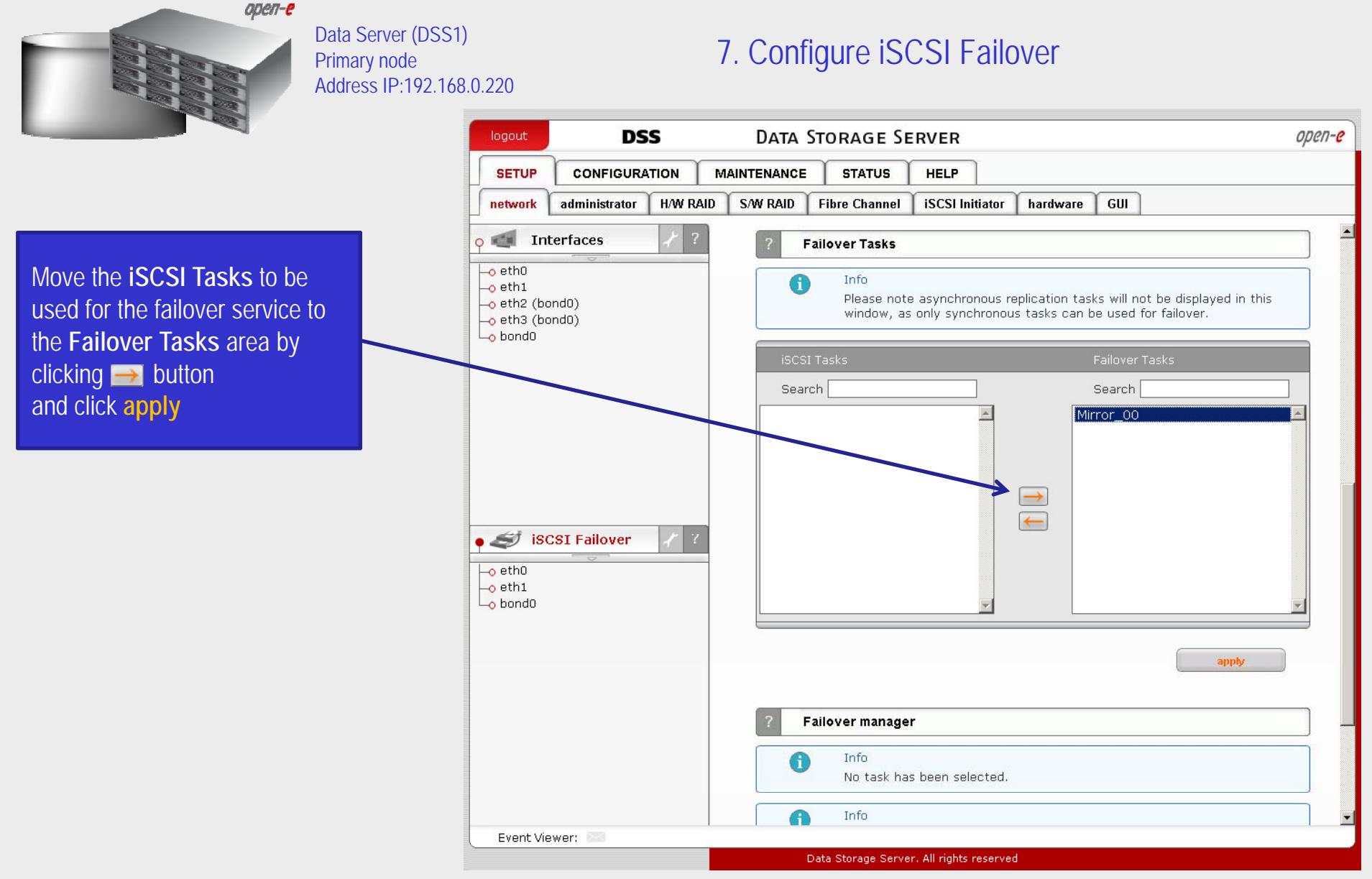
The screenshot shows the open-e Data Storage Server (DSS) interface. At the top, there is a 3D model of a server unit with the 'open-e' logo. Below it, text specifies 'Data Server (DSS2)', 'Secondary node', and 'Address IP:192.168.0.221'. The main window title is 'DSS DATA STORAGE SERVER'. The 'SETUP' tab is selected, showing sub-options: 'network', 'administrator', 'H/W RAID', 'S/W RAID', 'Fibre Channel', 'iSCSI Initiator', 'hardware', and 'GUI'. The 'iSCSI Initiator' tab is highlighted. On the left, there are two panels: 'Interfaces' (listing 'eth0', 'eth1', 'eth2 (bond0)', 'eth3 (bond0)', and 'bond0') and 'iSCSI Failover' (listing 'eth0', 'eth1', and 'bond0'). The 'iSCSI Failover' panel is currently active. The right side of the interface is divided into three main sections: 'Failover status' (Info: 'Failover statistics are unavailable due to the iSCSI Failover service being disabled. Please go to Failover Configuration to enable it.'), 'Failover configuration' (checkbox 'Enable iSCSI failover functionality' is checked, 'Primary node on localhost' is selected, 'Secondary node IP:' and 'Ping node IP:' fields are empty, 'Show advanced' is unchecked), and 'Failover Tasks' (Info: 'Please note asynchronous replication tasks will not be displayed in this window, as only synchronous tasks can be used for failover.'). At the bottom, there is an 'Event Viewer' section and a red footer bar with the text 'Data Storage Server. All rights reserved'.

Now, select iSCSI Failover

Now, in Failover configuration function , check the box **Enable iSCSI failover functionality** and enter Primary node IP address and click the **apply** button

Synchronous Volume Replication with Failover over a LAN *open-e*

7. Configure iSCSI Failover



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

Move the iSCSI Tasks to be used for the failover service to the Failover Tasks area by clicking  button and click apply

DSS DATA STORAGE SERVER

SETUP **CONFIGURATION** **MAINTENANCE** **STATUS** **HELP**

network administrator H/W RAID S/W RAID Fibre Channel iSCSI Initiator hardware GUI

Interfaces

- eth0
- eth1
- eth2 (bond0)
- eth3 (bond0)
- bond0

iSCSI Failover

- eth0
- eth1
- bond0

Failover Tasks

i Info
Please note asynchronous replication tasks will not be displayed in this window, as only synchronous tasks can be used for failover.

iSCSI Tasks	Failover Tasks
Search <input type="text"/>	Search <input type="text"/>
	Mirror_00

apply

Failover manager

i Info
No task has been selected.

i Info

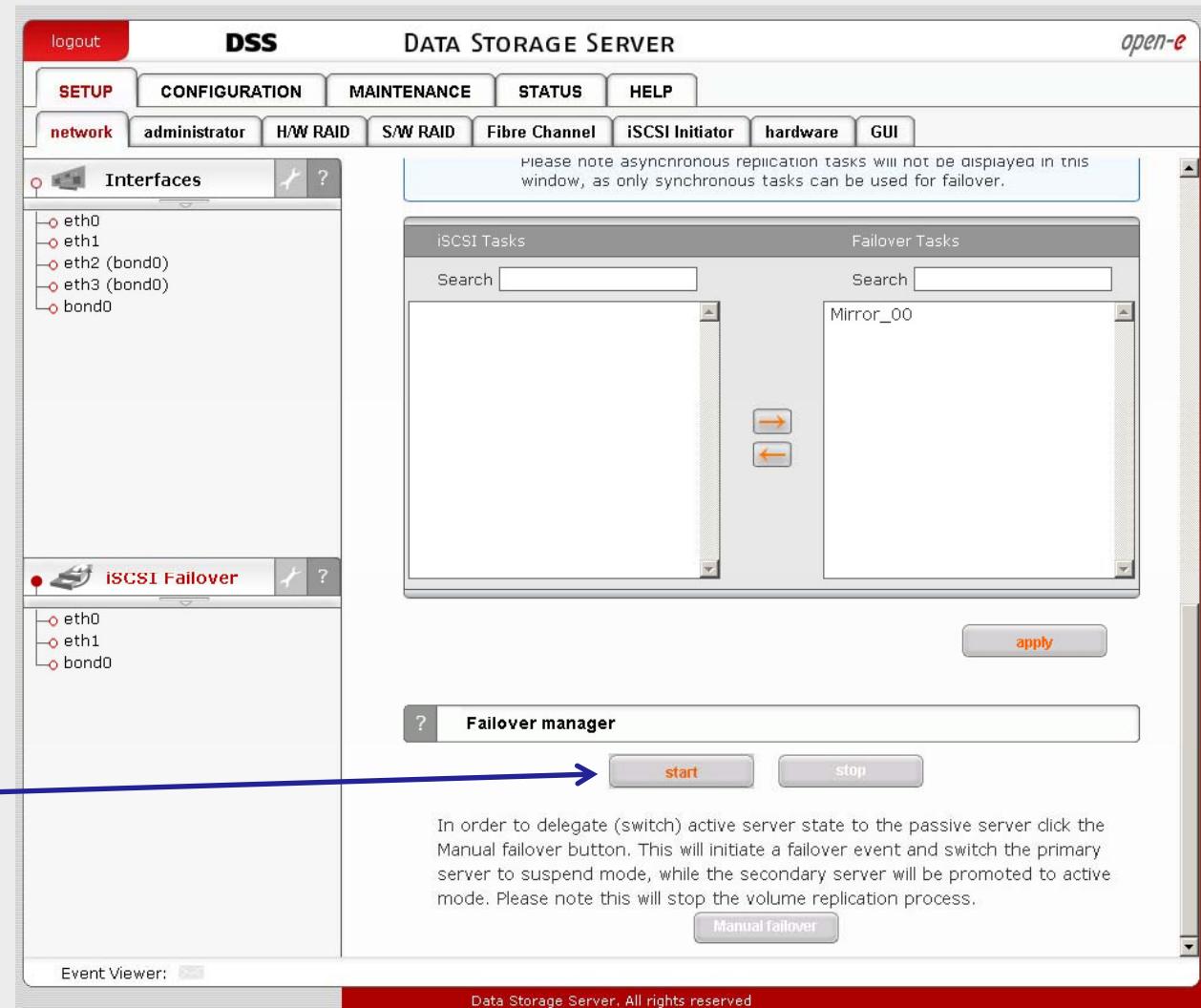
Event Viewer: 

Data Storage Server. All rights reserved

Synchronous Volume Replication with Failover over a LAN

 Data Server (DSS1)
Primary node
Address IP:192.168.0.220

8. Start Failover Service



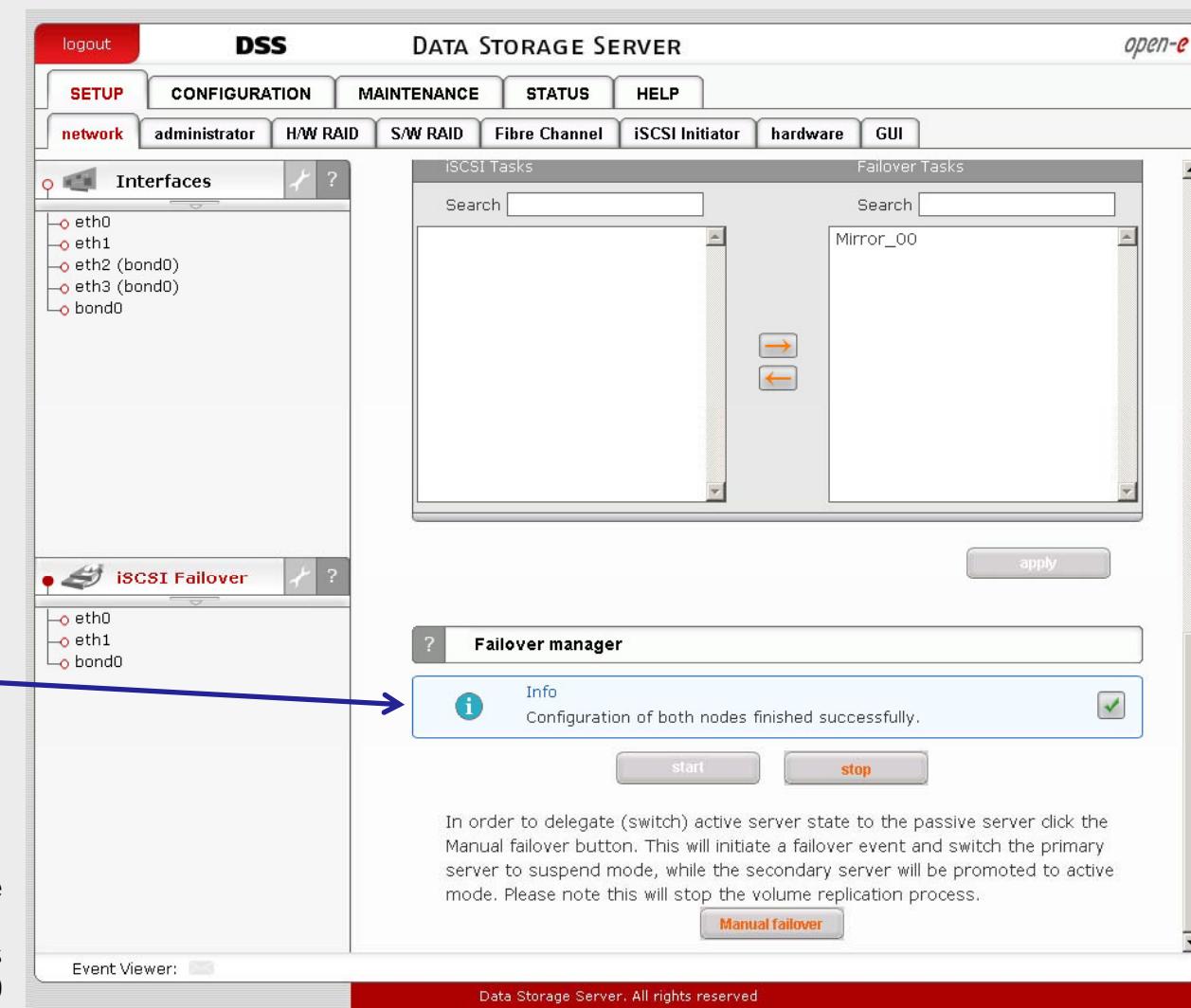
At this point both nodes are ready to start the Failover service

In order to delegate (switch) active server state to the passive server click the Manual failover button. This will initiate a failover event and switch the primary server to suspend mode, while the secondary server will be promoted to active mode. Please note this will stop the volume replication process.

Event Viewer:

Data Storage Server, All rights reserved

Synchronous Volume Replication with Failover over a LAN



8. Start Failover Service

Data Server (DSS1)
Primary node
Address IP:192.168.0.220

After clicking the **start** button configuration of both nodes will be complete

NOTE:
You can now connect via your iSCSI initiator and use your targets via the Virtual IP address e.g. 192.168.10.230 (For example, in a Microsoft Windows environment, download Microsoft iSCSI Initiator ver 2.0 or later).

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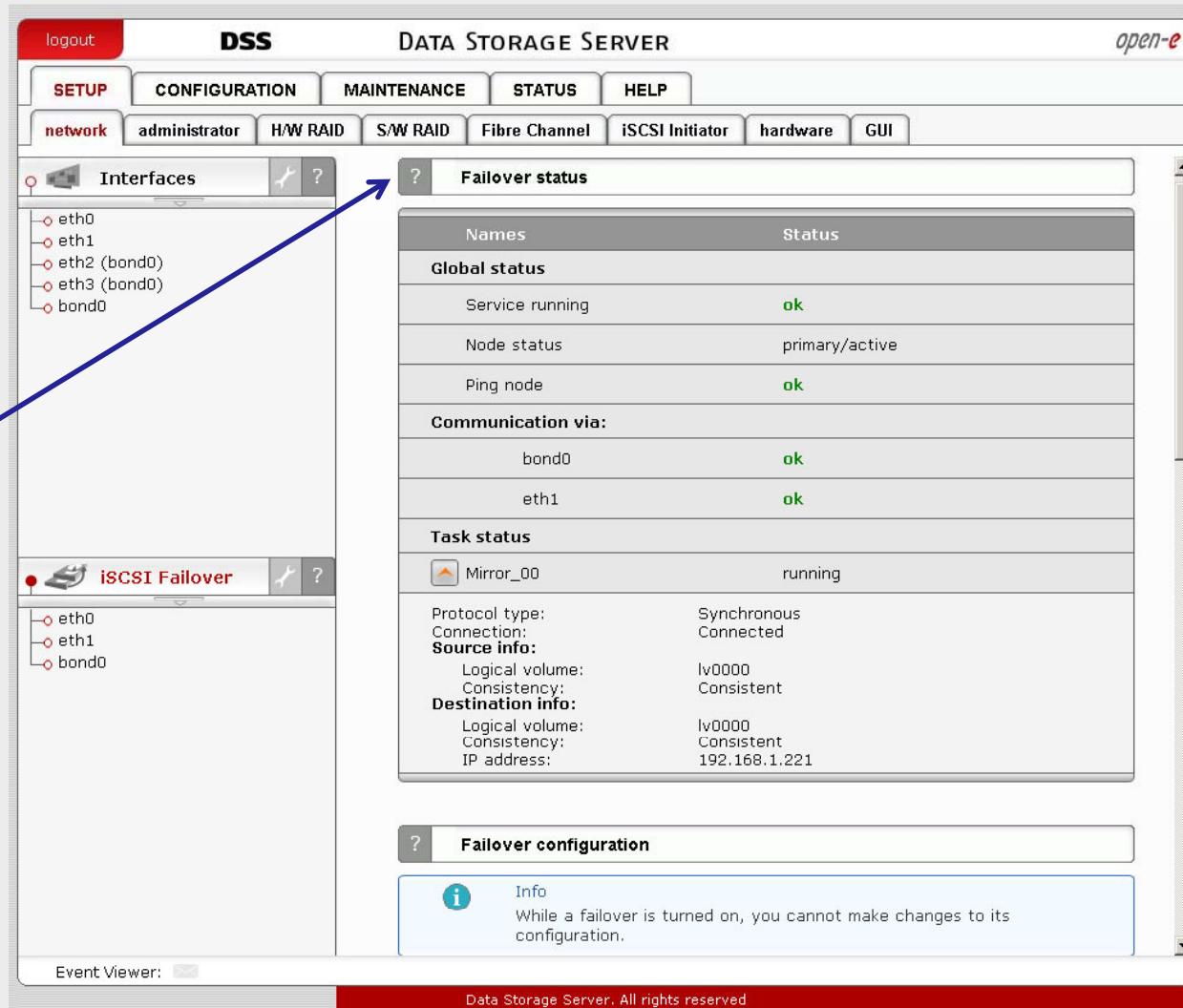
Synchronous Volume Replication with Failover over a LAN



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

8. Start Failover Service

After start Failover, check the status in **Failover status** function. All must read OK. In the task status, the destination volume must be consistent



The screenshot shows the DSS (Data Storage Server) web interface. The top navigation bar includes links for logout, SETUP (selected), CONFIGURATION, MAINTENANCE, STATUS, and HELP. Sub-navigation tabs include network, administrator, H/W RAID, S/W RAID, Fibre Channel, iSCSI Initiator, hardware, and GUI. The main content area has two sections: 'Interfaces' and 'iSCSI Failover'. The 'iSCSI Failover' section is highlighted with a blue arrow pointing to the 'Failover status' table. The 'Failover status' table contains the following data:

Names	Status
Global status	ok
Service running	ok
Node status	primary/active
Ping node	ok
Communication via:	
bond0	ok
eth1	ok
Task status	
Mirror_00	running
Protocol type:	Synchronous
Connection:	Connected
Source info:	
Logical volume:	lv0000
Consistency:	Consistent
Destination info:	
Logical volume:	lv0000
Consistency:	Consistent
IP address:	192.168.1.221

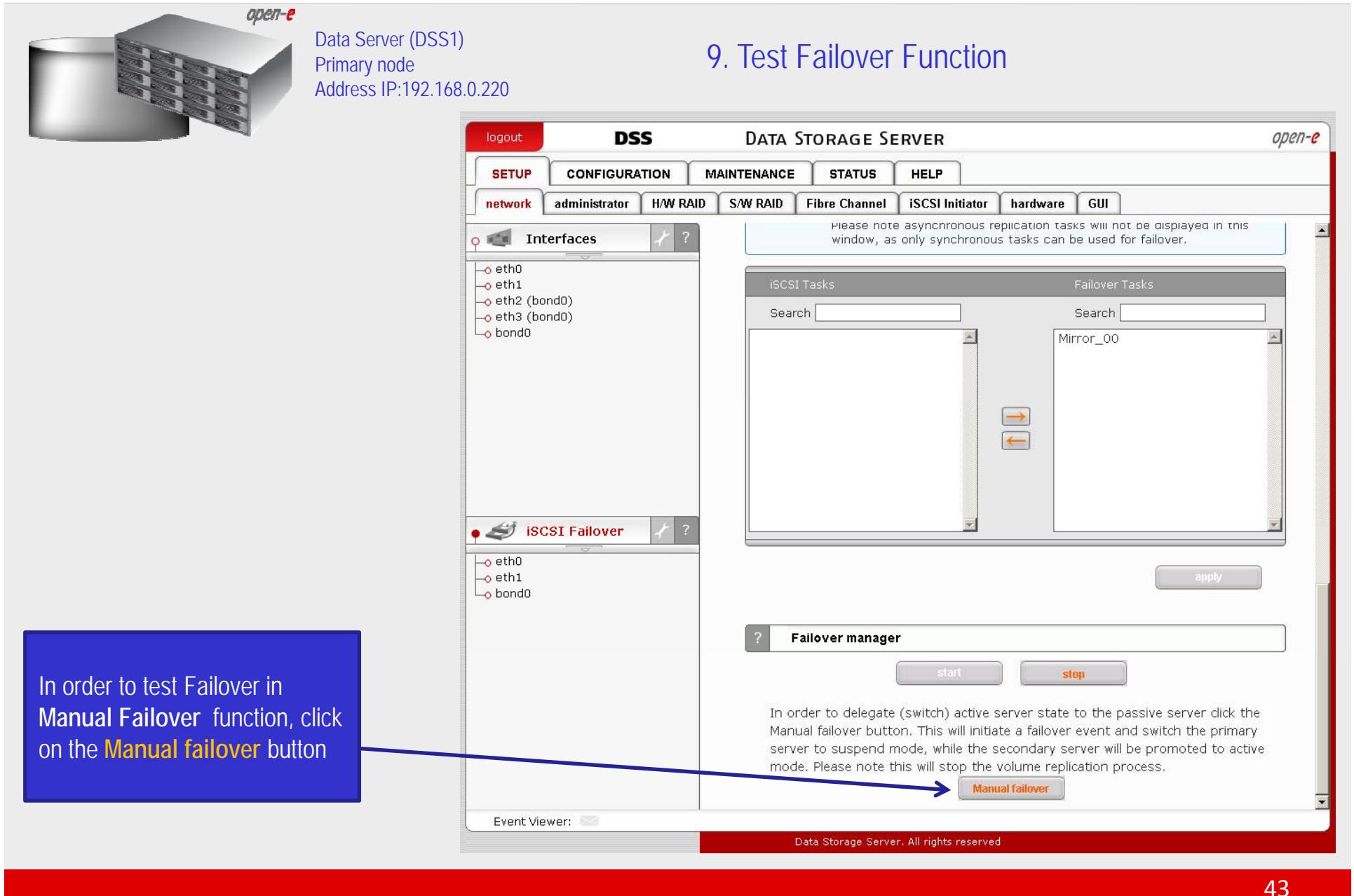
Below the table is a 'Failover configuration' section with an info message: 'While a failover is turned on, you cannot make changes to its configuration.'

iSCSI Failover/Volume Replication



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Synchronous Volume Replication with Failover over a LAN



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

9. Test Failover Function



DSS
DATA STORAGE SERVER

SETUP CONFIGURATION MAINTENANCE STATUS HELP

network administrator H/W RAID S/W RAID Fibre Channel iSCSI Initiator hardware GUI

Interfaces
eth0
eth1
eth2 (bond0)
eth3 (bond0)
bond0

iSCSI Failover
eth0
eth1
bond0

Please note asynchronous replication tasks will not be displayed in this window, as only synchronous tasks can be used for failover.

iSCSI Tasks Failover Tasks
Search Search
Mirror_00

Failover manager

start stop

In order to delegate (switch) active server state to the passive server click the Manual failover button. This will initiate a failover event and switch the primary server to suspend mode, while the secondary server will be promoted to active mode. Please note this will stop the volume replication process.

Manual failover

Event Viewer:

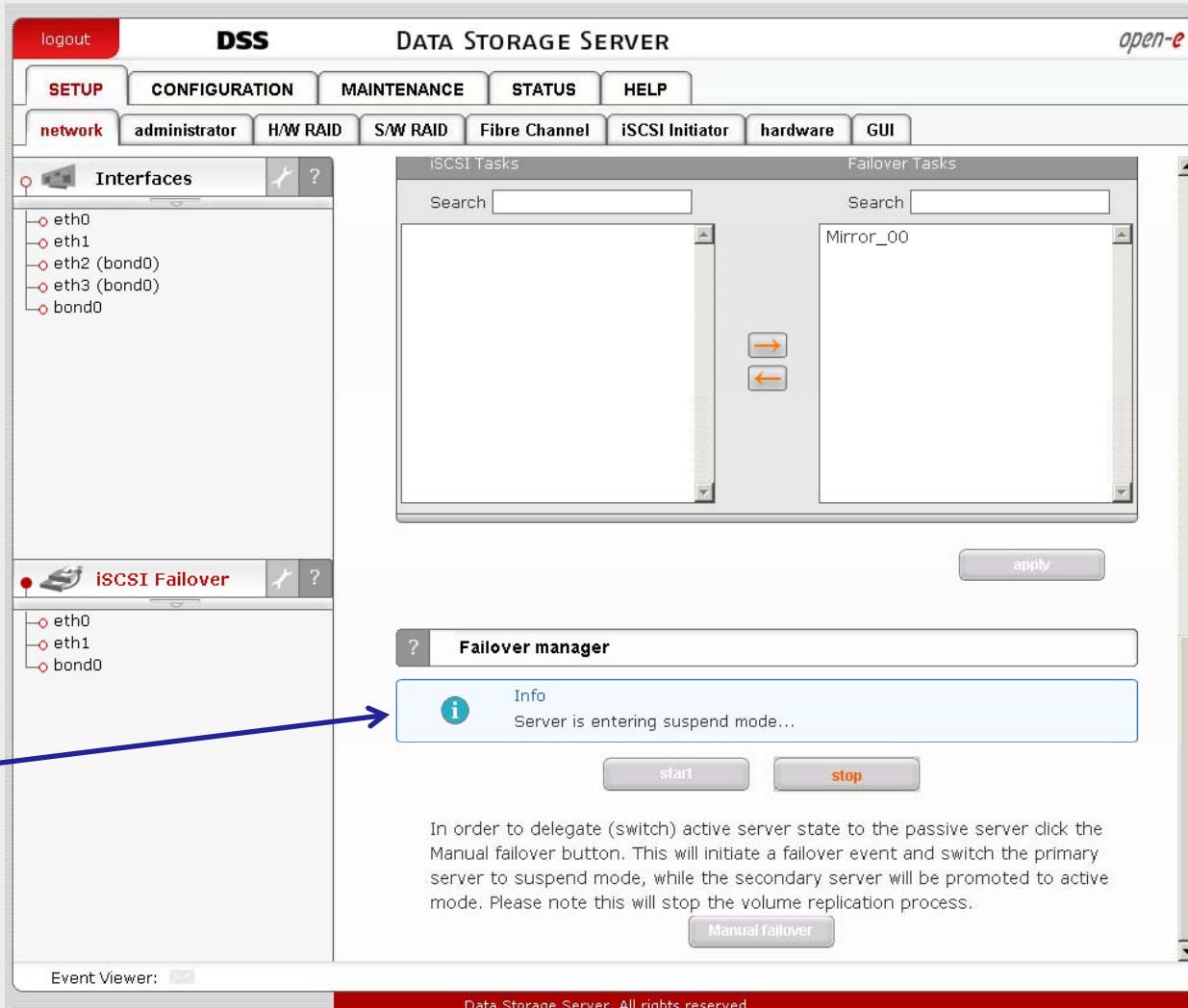
Data Storage Server. All rights reserved

In order to test Failover in
Manual Failover function, click
on the **Manual failover** button

Synchronous Volume Replication with Failover over a LAN *open-e*

 Data Server (DSS1)
Primary node
Address IP:192.168.0.220

9. Test Failover Function



After clicking on the **Manual failover** button, primary node enters suspend mode

In order to delegate (switch) active server state to the passive server click the **Manual failover** button. This will initiate a failover event and switch the primary server to suspend mode, while the secondary server will be promoted to active mode. Please note this will stop the volume replication process.

Manual failover

Event Viewer:

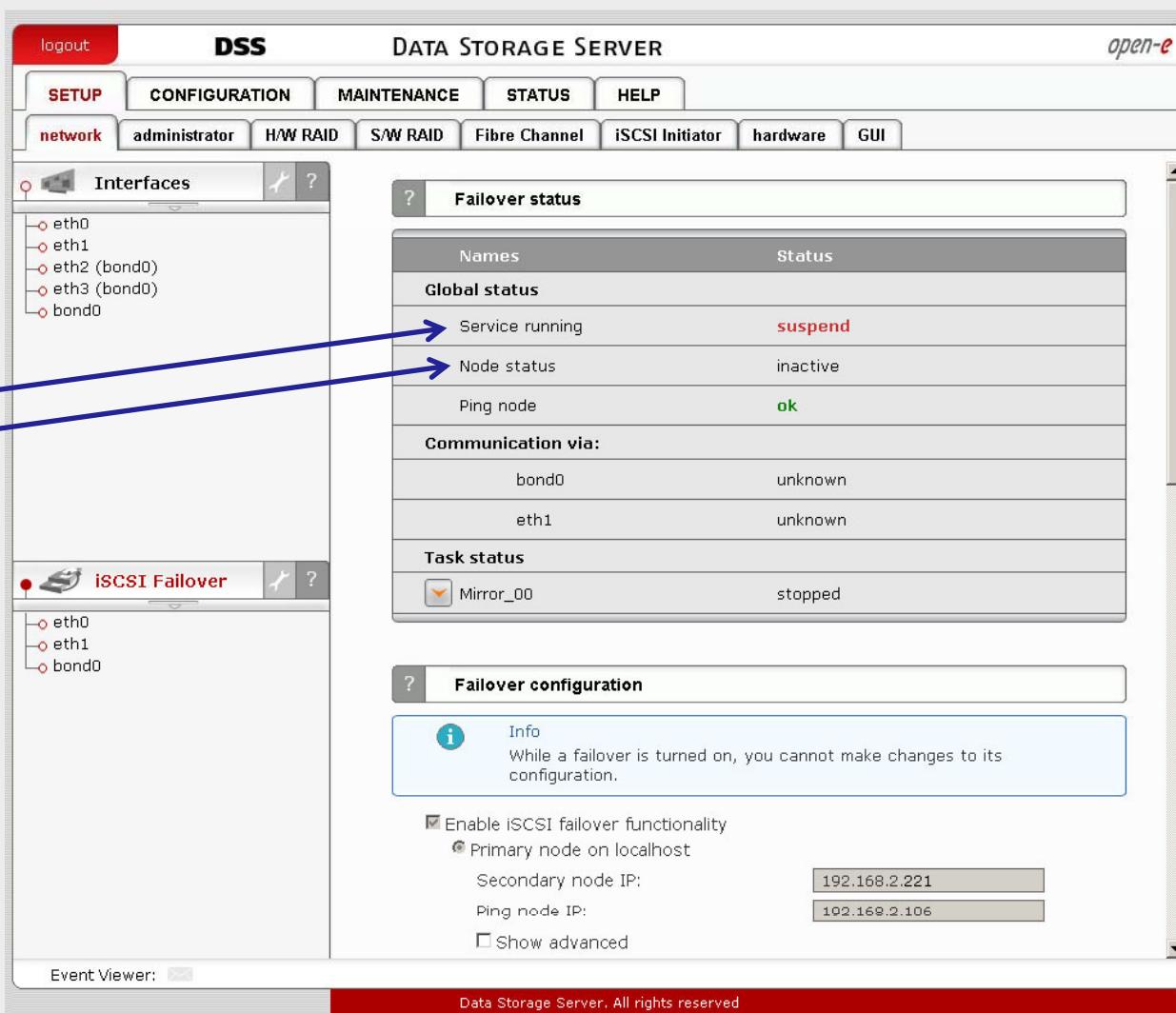
Data Storage Server. All rights reserved

Synchronous Volume Replication with Failover over a LAN



Data Server (DSS1)
Primary node
Address IP:192.168.0.220

9. Test Failover Function



The Failover status function shows the Global status of the primary node. Status service is in **suspend** mode and the node is **inactive**.

Names	Status
Global status	Service running
Node status	inactive
Ping node	ok

Communication via:

bond0	unknown
eth1	unknown

Task status

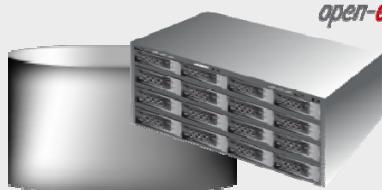
Mirror_00	stopped
-----------	---------

Failover configuration

Info: While a failover is turned on, you cannot make changes to its configuration.

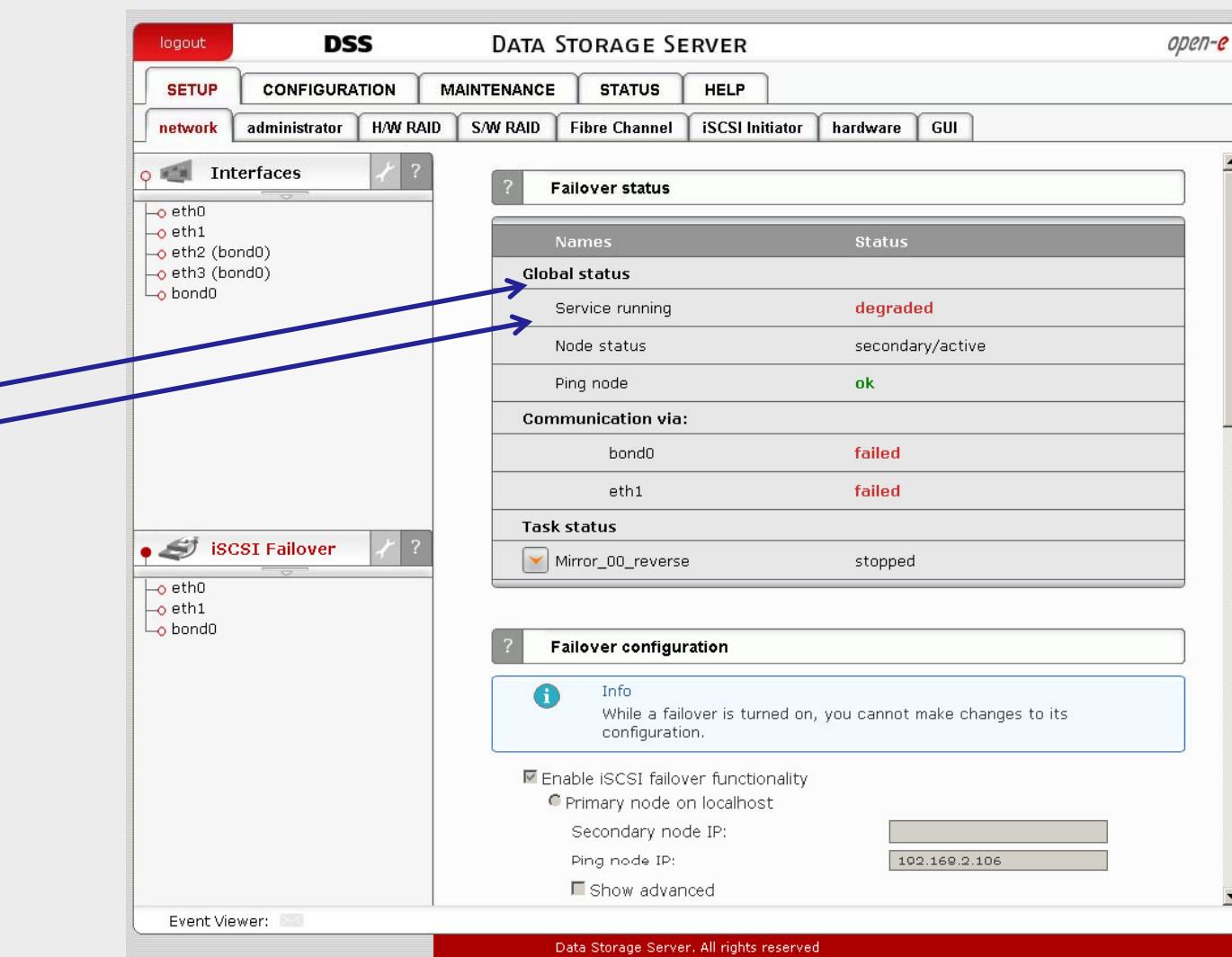
Enable iSCSI failover functionality
 Primary node on localhost
Secondary node IP: 192.168.2.221
Ping node IP: 192.168.2.106
 Show advanced

Synchronous Volume Replication with Failover over a LAN



Data Server (DSS2)
Secondary node
Address IP:192.168.0.221

9. Test Failover Function



In Failover status function Global status shows the status of the secondary node. The service status is **degraded** and Node status is **active**.

Names	Status
Global status	Service running
	degraded
Node status	secondary/active
Ping node	ok

Communication via:

bond0	failed
eth1	failed

Task status

Mirror_00_reverse	stopped
-------------------	---------

Failover configuration

Info: While a failover is turned on, you cannot make changes to its configuration.

Enable iSCSI failover functionality

Primary node on localhost

Secondary node IP:

Ping node IP:

Show advanced

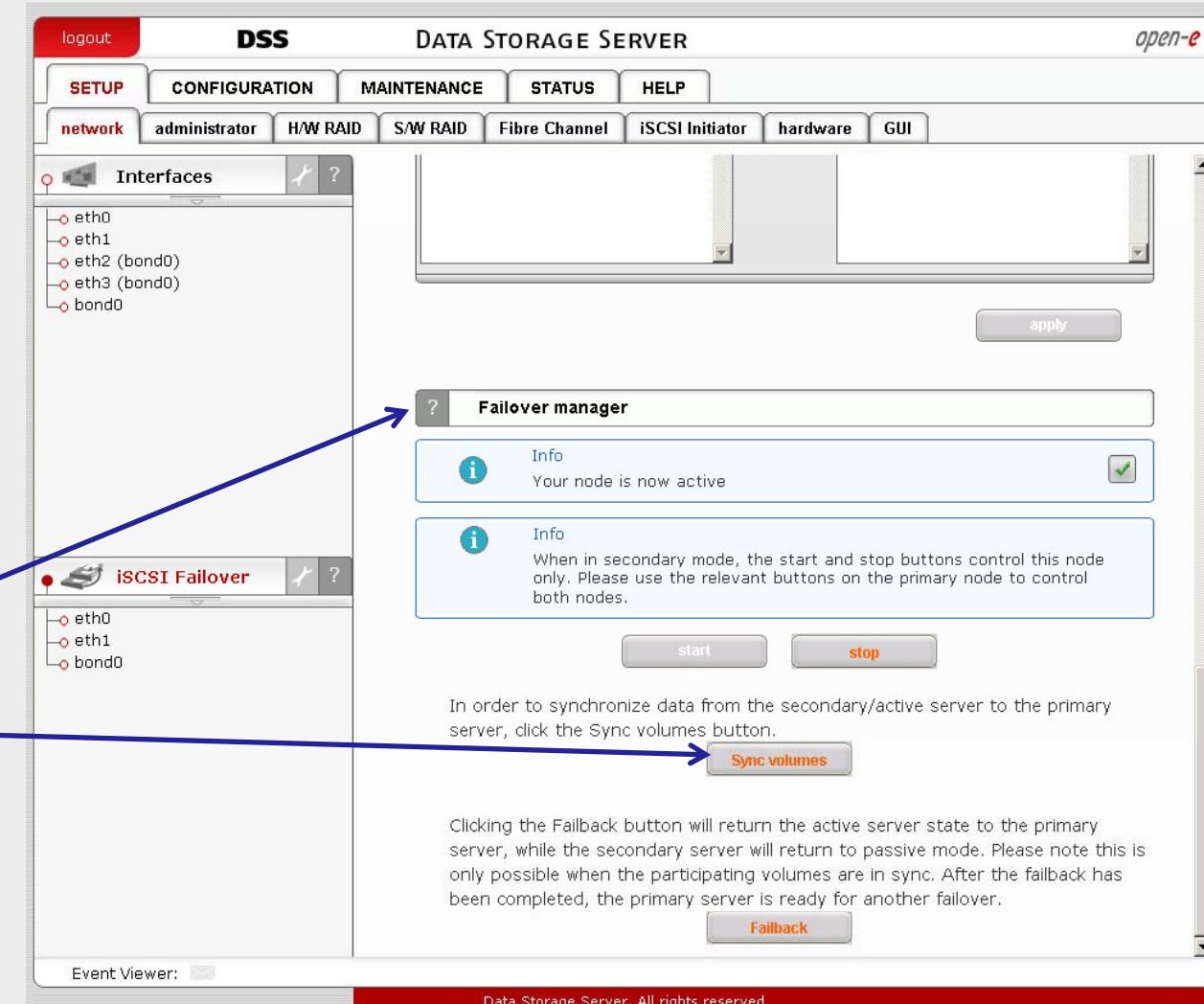
Event Viewer:

Data Storage Server. All rights reserved

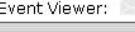
Synchronous Volume Replication with Failover over a LAN

 Data Server (DSS2)
Secondary node
Address IP:192.168.0.221

10. Run Failback Function



In order to run Failback in Failover manager function click on the **Sync volumes** button first.

Event Viewer: 

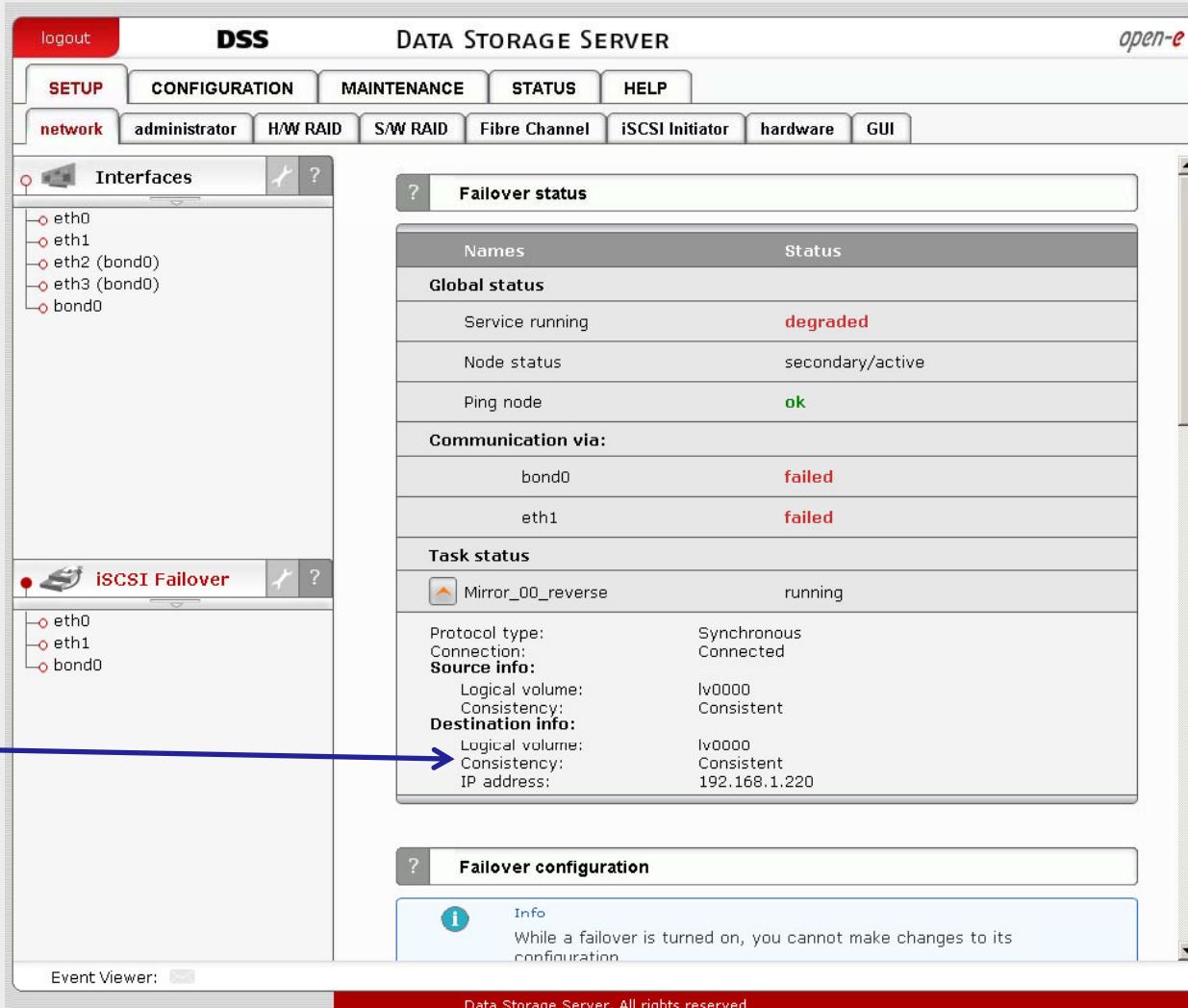
Data Storage Server. All rights reserved

Synchronous Volume Replication with Failover over a LAN

 Data Server (DSS2)
Secondary node
Address IP:192.168.0.221

10. Run Failback Function

After synchronization the task status of the destination volume must be Consistent


Failover status table:

Names	Status
Global status	degraded
Service running	degraded
Node status	secondary/active
Ping node	ok
Communication via:	
bond0	failed
eth1	failed
Task status	
Mirror_00_reverse	running

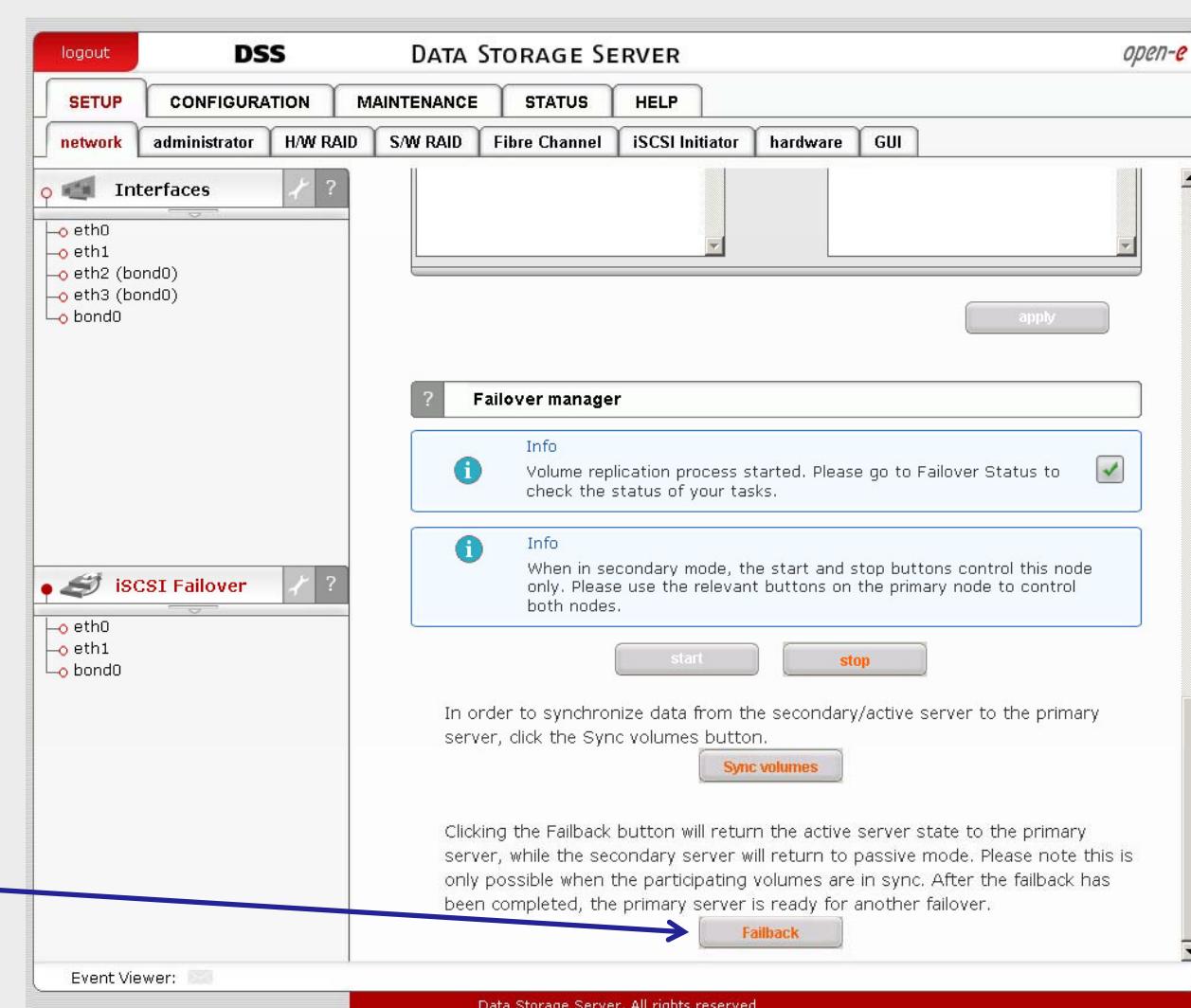
Task details:

Protocol type:	Synchronous
Connection:	Connected
Source info:	
Logical volume:	lv0000
Consistency:	Consistent
Destination info:	
Logical volume:	lv0000
Consistency:	Consistent
IP address:	192.168.1.220

Failover configuration info:

While a failover is turned on, you cannot make changes to its configuration.

Synchronous Volume Replication with Failover over a LAN



Data Server (DSS2)
Secondary node
Address IP:192.168.0.221

10. Run Failback Function

In order to return the active server state to the Primary server click on the **Failback** button

DSS DATA STORAGE SERVER

SETUP **CONFIGURATION** **MAINTENANCE** **STATUS** **HELP**

network administrator H/W RAID S/W RAID Fibre Channel iSCSI Initiator hardware GUI

Interfaces

- eth0
- eth1
- eth2 (bond0)
- eth3 (bond0)
- bond0

iSCSI Failover

- eth0
- eth1
- bond0

Failover manager

Info
Volume replication process started. Please go to Failover Status to check the status of your tasks.

Info
When in secondary mode, the start and stop buttons control this node only. Please use the relevant buttons on the primary node to control both nodes.

start **stop**

In order to synchronize data from the secondary/active server to the primary server, click the Sync volumes button.

Sync volumes

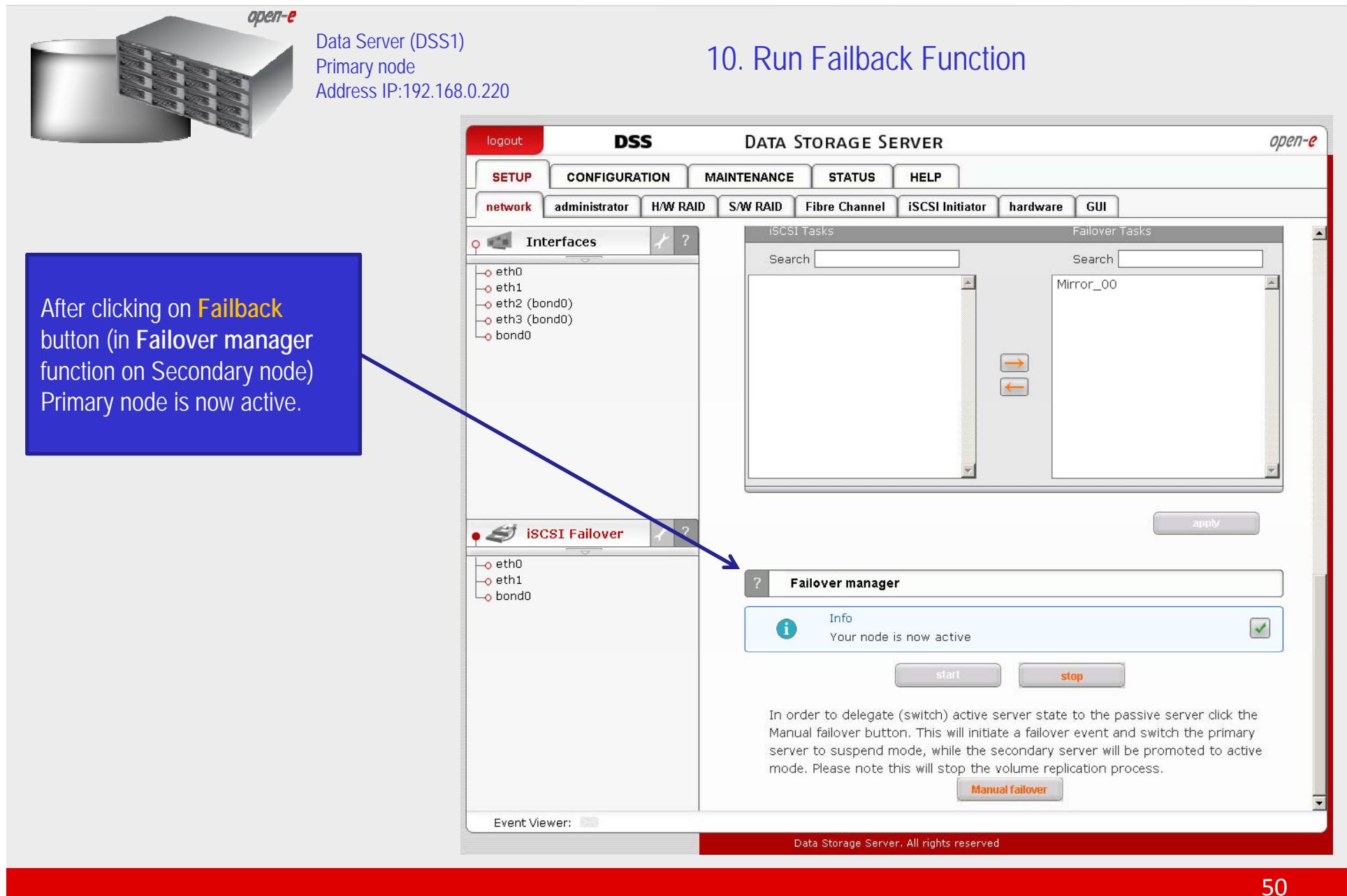
Clicking the Failback button will return the active server state to the primary server, while the secondary server will return to passive mode. Please note this is only possible when the participating volumes are in sync. After the failback has been completed, the primary server is ready for another failover.

Failback

Event Viewer: 

Data Storage Server. All rights reserved

Synchronous Volume Replication with Failover over a LAN *open-e*

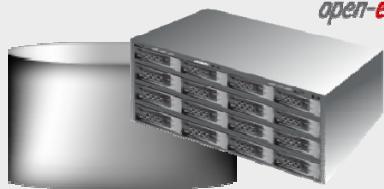


After clicking on **Failback** button (in Failover manager function on Secondary node)
Primary node is now active.

10. Run Failback Function

The screenshot shows the open-e Data Storage Server (DSS) interface. The top navigation bar includes **logout**, **DSS**, **DATA STORAGE SERVER**, and **open-e**. The main menu tabs are **SETUP**, **CONFIGURATION**, **MAINTENANCE**, **STATUS**, and **HELP**. The **SETUP** tab is selected, showing sub-options: **network**, **administrator**, **H/W RAID**, **S/W RAID**, **Fibre Channel**, **iSCSI Initiator**, **hardware**, and **GUI**. The **network** tab is active, displaying a list of interfaces: **eth0**, **eth1**, **eth2 (bond0)**, **eth3 (bond0)**, and **bond0**. A blue arrow points from the text box to the **iSCSI Failover** section. The **iSCSI Failover** section shows a list of interfaces: **eth0**, **eth1**, and **bond0**. To the right, the **Failover manager** section displays the message: "Your node is now active". Below this, a note states: "In order to delegate (switch) active server state to the passive server click the Manual failover button. This will initiate a failover event and switch the primary server to suspend mode, while the secondary server will be promoted to active mode. Please note this will stop the volume replication process." A **Manual failover** button is located at the bottom of this section. The bottom of the interface features an **Event Viewer** and a red footer bar with the text "Data Storage Server, All rights reserved".

Synchronous Volume Replication with Failover over a LAN

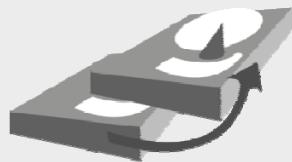


Data Server (DSS1)
Primary node
Address IP:192.168.0.220

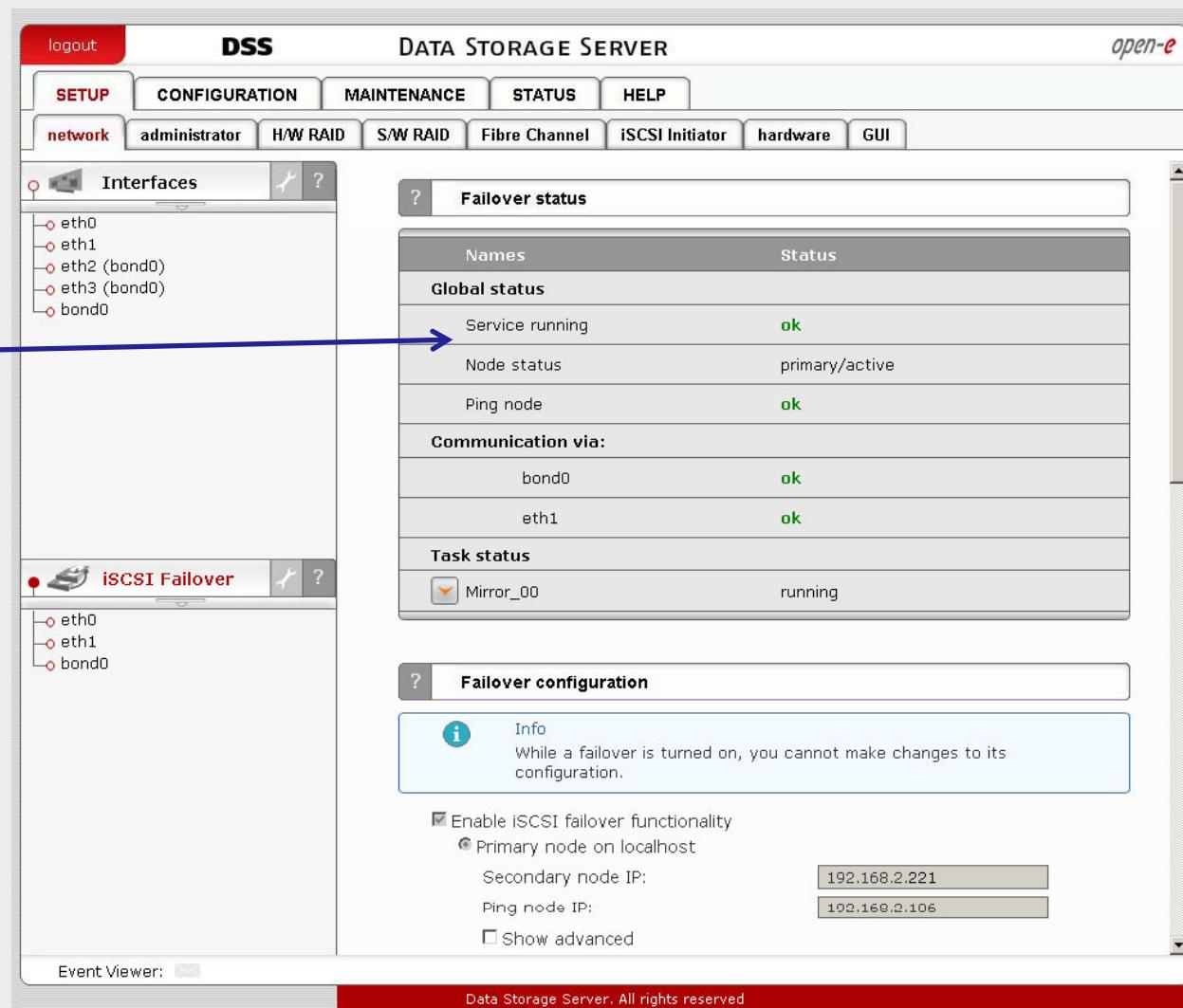
10. Run Failback Function

Primary node is active again
and ready for Failover.

iSCSI Failover/Volume Replication



The configuration and testing of
iSCSI Failover/Failback is now
complete.



The screenshot shows the DSS (Data Storage Server) interface with the following details:

- Interfaces:** Shows network interfaces: eth0, eth1, eth2 (bond0), eth3 (bond0), and bond0.
- iSCSI Failover:** Shows network interfaces: eth0, eth1, and bond0.
- Failover status:**

Names	Status
Global status	Service running: ok
Node status	primary/active
Ping node	ok
Communication via:	
bond0	ok
eth1	ok
Task status	
Mirror_00	running
- Failover configuration:**

Info: While a failover is turned on, you cannot make changes to its configuration.

Enable iSCSI failover functionality
 Primary node on localhost
Secondary node IP: 192.168.2.221
Ping node IP: 192.168.2.106
 Show advanced

Thank You!